University of Regina

DEPARTMENT OF MATHEMATICS & STATISTICS

ACADEMIC UNIT REVIEW SELF STUDY REPORT

2022 – 2023

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TERRITORIAL ACKNOWLEDGEMENT

The University of Regina is situated on Treaty 4 lands with a presence in Treaty 6. These are the territories of the nêhiyawak, Anihšināpēk, Dakota, Lakota, and Nakoda, and the homeland of the Métis/Michif Nation. Today, these lands continue to be the shared Territory of many diverse peoples from near and far.

1. BACKGROUND

The Department of Mathematics and Statistics at the University of Regina has a long history dating back to the early days of the institution. It was one of the founding academic units when the University of Regina was established as an independent institution in 1974. However, its origins can be traced back to 1911 when Regina College was established and began offering advanced Mathematics courses. Over the years, the department has grown and evolved, offering a wide range of undergraduate and graduate programs and conducting research in various areas of Mathematics, Statistics, Actuarial Science and Data Science. Today, it continues to play an important role in the University of Regina and in the broader mathematical and statistical community.

The Department of Mathematics and Statistics is a prominent and active academic unit within the Faculty of Science. The faculty, comprised of 23 full-time members, is dedicated to providing students with a high-quality education in various mathematical and statistical fields. In addition, faculty members are actively engaged in research, and the department is committed to advancing scientific knowledge through research opportunities and collaborations with other departments and institutions. The department has a strong record of research productivity, with a large majority of the permanent faculty members actively publishing in refereed journals, conference proceedings, books, and technical reports, serving on editorial boards, acting as referees for journals, and organizing regional, national, and international conferences.

Our department offers undergraduate programs in Actuarial Science, Data Science, Mathematics, and Statistics. These areas of focus provide students with a solid foundation in mathematical and statistical theory and practical skills in data analysis and modeling. This allows graduates to have a broad range of career options such as insurance, finance, technology, research, and education. Additionally, the programs also prepare students for further studies at the graduate level in a variety of disciplines.

The department has a strong graduate program that offers both Master's and PhD degrees in various areas of Mathematics and Statistics. These areas of interest include Algebra, Analysis, Applied Mathematics, Computational Mathematics, Discrete Mathematics, Topology, Probability and Statistics, Actuarial Science, and more, providing students with advanced training in mathematical and statistical theory and opportunities for research in cutting-edge areas of the field. Graduates of the program are equipped with the skills and knowledge necessary to work in academia, industry or government, as well as pursue further studies in related fields. Our graduate program also offers opportunities to work on interdisciplinary projects, collaborate with other departments and institutions, and have access to state-of-the-art facilities and resources.

Our department is also known for its strong presence in service initiatives, both within the university and the wider community. The department works to promote the understanding and appreciation of Mathematics and Statistics through various outreach and education programs. This includes workshops, seminars, and other events that are designed to engage the community and raise awareness of the importance of Mathematics and Statistics in our daily lives. In addition, faculty members and students in the department are actively involved in various service initiatives, such as volunteering in local schools, mentoring programs, and providing support and resources to under-represented groups in Mathematics and Statistics.

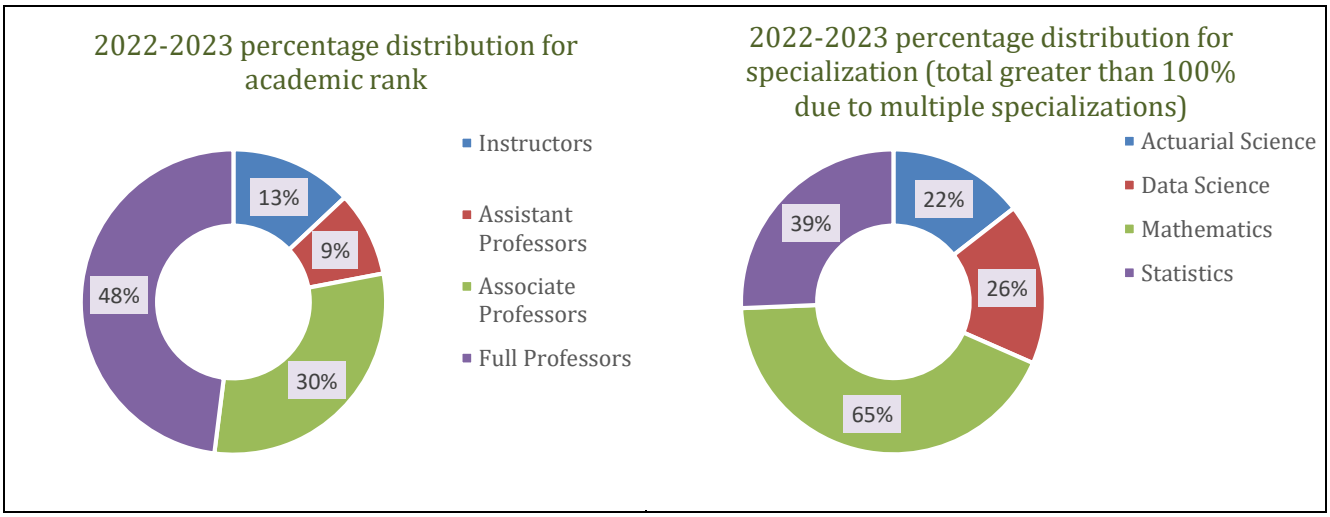
2. STAFFING AND RESOURCES

2.1 Staffing - faculty, instructors, lab instructors, technicians, and support staff

2.1.1 Academic Staff Members of the Department of Mathematics and Statistics

The Department of Mathematics and Statistics consists of 23 permanent academic staff, of which 3 are Instructors, 2 are Assistant Professors, 7 are Associate Professors, and 11 are Professors.

Among the 23 permanent academic staff, 5 are specialized in Actuarial Science (research and/or teaching), 6 in Data Science (research and/or teaching), 15 in Mathematics (research and/or teaching), 9 in Statistics (research and/or teaching), some of them with multiple specializations.



Name	Position and Rank	Notes
Martín Argerami	Professor	Mathematics
Taehan Bae	Associate Professor	Actuarial Science, Data Science, Statistics
Sarah Carnochan Naqvi	Laboratory Instructor	Actuarial Science, Data Science, Mathematics, Statistics
Dianliang Deng	Professor	Statistics, Data Science
Peter Douglas	Instructor III	Actuarial Science, Statistics
Juliana Erlijman	Associate Professor	Mathematics
Shaun Fallat	Professor	Mathematics
Douglas Farenick	Professor and Dean of Science	Mathematics
Remus Floricel	Associate Professor and Head	Mathematics
Martin Frankland	Associate Professor	Mathematics
Chun-Hua Guo	Professor	Mathematics
Allen Herman	Professor	Mathematics
Michael Kozdron	Associate Professor	Mathematics, Statistics
Patrick Maidorn	Instructor III	Mathematics, Statistics

Name	Position and Rank	Notes
Augustin-Liviu Mare	Associate Professor	Mathematics
Richard McIntosh	Professor	Mathematics
James McVittie	Assistant Professor	Data Science, Statistics
Karen Meagher	Professor	Mathematics
Donald Stanley	Professor	Mathematics
Fernando Szechtman	Professor	Mathematics
Jan-Paul Venter	Assistant Professor	Actuarial Science, Statistics
Andrei Volodin	Professor	Actuarial Science, Data Science, Statistics
Yang Zhao	Associate Professor	Data Science, Statistics

2.1.2 Associate Faculty and Instructors of the Department of Mathematics and Statistics at Federated Colleges (Luther, Campion and FNUC)

Name	Position and Rank	Notes
Vijayaparvathy Agasthian	Instructor	Luther College Mathematics, Statistics
Edward Doolittle	Associate Professor	First Nations University of Canada Mathematics, Statistics
Iqbal Husain	Associate Professor	Luther College Mathematics
Fotini Labropulu	Professor	Luther College Mathematics
Robert Petry	Assistant Professor	Campion College Mathematics, Statistics
Arzu Sardarli	Professor	First Nations University of Canada Mathematics, Statistics

2.1.3 Adjunct Faculty of the Department of Mathematics and Statistics

Name	Position and Rank	Notes
Ejaz Ahmed	Adjunct Professor	Professor and Dean Faculty of Mathematics and Science Brock University
Alya O. Al Mutairi	Adjunct Professor	Associate Professor Taibah University
Shonda Dueck	Adjunct Professor	Associate Professor Mathematics and Statistics University of Winnipeg
Shakhawat Hossain	Adjunct Professor	Professor Mathematics and Statistics University of Winnipeg
Shahla Nasserasr	Adjunct Professor	Assistant Professor

Name	Position and Rank	Notes
		School of Mathematical Sciences Rochester Institute of Technology
Sarah Plosker	Adjunct Professor	Associate Professor and Canada Research Chair Brandon University

2.1.4 Emeritus Professors of the Department of Mathematics and Statistics

Name	Position and Rank	Notes
Chris Fisher	Emeritus Professor	Still active in research
Bruce Gilligan	Emeritus Professor	Still active in research
Larry Miller	Emeritus Professor	
Jim Tompkins	Emeritus Professor	
Denis Hanson	Emeritus Professor	

2.1.5 Pacific Institute for the Mathematical Sciences (PIMS) Postdoctoral Fellows 2013-2022

Name	Years	Supervisor
Mohammad Jabbari	2022-2024	Martin Argerami
Raghu Tej Pantagi	2022-2024	Karen Meagher
Prateek Vishwakarma	2021-2023	Shaun Fallat
Seyed Mojallal	2020-2022	Shaun Fallat
Tseleung So	2019-2022	Donald Stanley
Daniel Drimbe	2018-2020	Remus Floricel
Ferdinand Ihringer	2017-2019	Karen Meagher
Asghar Ghorbanpour	2016-2018	Remus Floricel
Paul Tsopmene	2015-2019	Donald Stanley
Ryan Tifenbach	2014-2016	Shaun Fallat
Soumen Sarkar	2012-2014	Donald Staney

2.1.6 Support Staff

Name	Position and Rank	Notes
Sara Apperley	Administrative Assistant	
Connie Renwick	Program Coordinator	Shared with the Department of Computer Science

2.2 Resources

The department occupies part of the third floor of the College West building. This space includes

- offices for each faculty member;
- offices for graduate students, postdoctoral fellows and visitors;

- a multi-purpose lounge area, shared with the Department of Computer Science, which is equipped with a large blackboard and a 86" TV with computer connection for presentations;
- a computer lab used for teaching purposes.

The Department Main Office, which also houses the Department of Computer Science Main Office, consists of an open area for the Administrative Assistants, an office for the Academic Program Coordinator, and a small board room.

2.2.1 Teaching space dedicated to the Department of Mathematics and Statistics

Room	Capacity	Function
CW307.37	20	Computer Lab
CW307.20	20	Multi-purpose

2.2.2 Specialized teaching equipment and instrumentation

Equipment/Instrumentation	Location	Notes
Mimeo Teach for Whiteboards	CW307.14.5 CW307.29 CW307.37	This can be used to convert whiteboards into a smart board
BENQ Data Projector	CW307.29	Portable projector
Panasonic PT EZ590 Data Projector	CW307.37	Ceiling mounted projector in Computer Lab. There is a wall connection by the instructor's desk to connect computers to the projector.
24 Dell PCs for Computer Lab	CW307.37 CW307.29 CW307.16	21 computers are in the computer lab, 1 in the Lab Instructor's office, 2 spares in storage.
2 Dell PCs for Sessional Lecturers	LB263	
30 WACOM Pen Tablets	CW307.29	To be signed out by faculty/staff/TA's

2.2.3 Research equipment and instrumentation

Equipment/Instrumentation	Location	Funding agency	Notes
NEC P474U Data Projector	CW307.16	U of R	Formerly in Meeting Room
Sony 65" TV	CW307.14.3	U of R	
Dell PC for TV Connection	CW307.14.3	U of R	with wireless keyboard
NEC Multisync C861Q 86" TV	CW307.20	U of R	Configured with an HDMI wall connection for computer hook-up.
35 Dell PC's for Graduate Students and Post Docs	CW307.9 CW307.18 CW307.25 CW307.28 CW307.30 CW307.32 CW307.33	U of R	

3. SCHOLARLY OUTPUT

3.1 Summary

The Department of Mathematics and Statistics has maintained a high level of research activity over the last ten years. Of the 23 permanent faculty members of our department, 18 faculty members have been active in research, publishing refereed journal articles or conference proceedings, books, and technical reports, serving on editorial boards and acting as referees for journals, and organizing regional, national, and international conferences.

During the last ten years, 17 members of our department have received individual NSERC awards totalling $2,298,500.00 CAD. While most of the external funding we receive is Tri-council, it is not the only source of external research funding. The University of Regina is a full institutional member in the Pacific Institute for the Mathematical Sciences (PIMS), which has provided our faculty with additional external funding for supporting PIMS postdoctoral fellowships, and funding for research conferences, research visits, and inter-university collaborative research groups. Additional external funding for summer student internships has come from Mitacs via its Globalink internship program.

The department's publication rate over the last ten years has averaged 3 publications per month, and these works have received over 900 citations on MathSciNet©. In the last ten years, all of our research-active faculty have regularly published papers in top-tier internationally recognized journals. In addition, several of the undergraduate students, graduate students, and postdoctoral fellows under our training have been able to make high-quality contributions.

The department is committed to providing a stimulating and dynamic learning environment that promotes and supports research at all levels. The department has a proven history of fostering undergraduate research potential, demonstrated by the significant participation of its students in the NSERC Undergraduate Student Research Awards program (NSERC USRA), which is among the highest in the university. Our undergraduate students have also excelled in international math competitions, such as the Putnam, and have actively participated in and presented at undergraduate conferences, such as CUMC and ASNA. Our graduate students and postdoctoral fellows are also deeply involved in research and their work is widely recognized for its quality, leading to successful careers in academia or industry. To support their research training, the department organizes weekly scientific research seminars, and a weekly colloquium that brings together all members of the department. Additionally, the department occasionally hosts PIMS Distinguished Lectures, as well as the H.N. Gupta Memorial Lecture, an annual event that is made possible through the generous financial support of the Gupta family.

The impact of the department's research activity is both academic and economic, and is felt regionally, nationally, and internationally. Conferences and workshops organized by our faculty members during the last decade have taken place in Regina and elsewhere in Canada, North America, Europe, and Asia. Organizing these events requires a high level of interaction between scholars located in many different countries. The largest of these events was the 2019 Summer Meeting of the Canadian Mathematical Society, which drew over 300 participants from all over the world to the University of Regina campus in June of 2019. Our faculty members have been successful in competitive funding from the Canadian mathematics institutes (BIRS, Fields, CRM, and PIMS), earning one BIRS workshop, one Fields Thematic Semester, and two PIMS Collaborative Research Group awards in the last decade.

3.1.1 Statistical Summary of Published and Accepted Scholarly Work 2013-2022

	Number	Notes
Refereed journal articles	351	*Source: MathSciNet, -includes 47 by trainees
Refereed conference proceedings	5	*Source: MathSciNet
Technical reports	3	
Books	2	*Source: MathSciNet
Conference Presentations	93	*Source: CVs and Google
Competitive Research Event Awards (BIRS/Fields/CRM Workshops, PIMS CRGs)	4	*Source: CVs and Google
Service on Editorial Boards	10	*Source: CVs and Google
Conferences/Workshops organized	15	*Source: CVs and Google
Special sessions organized	11	*Source: CVs and Google

3.1.2 NSERC Grants 2013-2022

Principal Investigator(s)	NSERC Program	Total Amount
Martin Argerami	NSERC DG	$ 69,000
Taehan Bae	NSERC DG and DDG	$ 153,000
Dianliang Deng	NSERC DG	$ 135,000
Juliana Erlijman	NSERC DG	$ 28,000
Shaun Fallat	NSERC DG	$ 212,000
Douglas Farenick	NSERC DG	$ 205,000
Remus Floricel	NSERC DG and DDG	$ 121,000
Martin Frankland	NSERC DG and DLS	$ 76,500
Bruce Gilligan	NSERC DG	$ 135,000
Chun-Hua Guo	NSERC DG	$ 179,000
Allen Herman	NSERC DG	$ 144,000
Michael Kozdron	NSERC DG	$ 75,000
Karen Meagher	NSERC DG	$ 175,000
Donald Stanley	NSERC DG	$ 227,000
Fernando Szechtman	NSERC DG	$ 123,000
Andrei Volodin	NSERC DG	$ 156,000
Yang Zhao	NSERC DG and DDG	$ 85,000
Total		**$ 2,298,500**

3.1.3 Other External Funding Received

Principal Investigator(s)	Funding Agency	Total Amount	Dates
Dianliang Deng	Regina Qu'Appelle Health Region	$ 48,000	2013-2015
Douglas Farenick (Science)	NSERC PromoScience	$ 103,200	2020 and 2022
Dept of Math and Stats	Gupta Memorial	$ 63,234.51	2017-2018
Shaun Fallat	Ministry of Justice	$ 5,000	2017-2018
D. Deng, S. Fallat, A. Herman, and M. Frankland	MITACS Globalink	$ 44, 500	2012, 2016, 2017, 2020, 2021
Various	PIMS	$ 95,000	2013-2022
Total		**$ 358,934.51**	

4. COMMUNITY SERVICE INITIATIVES

The Department of Mathematics and Statistics is an active participant in numerous service initiatives, both on campus and in the surrounding community. The department's expertise in Mathematics and Statistics makes it a valuable resource for other departments, organizations, and industries.

The department organizes several regular events aimed at elementary and high school students on campus. The **Mathematics Enrichment Camp** is an annual full day event (attended by 100 students in February 2020), at which faculty and student volunteers guide participants through mathematically oriented activities and games. **Math Circle** is a series of afternoon/evening session with a focus on problem solving skills and collaborative learning (attended by 60 students bi-weekly in Fall 2019/Winter 2020). The department has also been an organizer and host of several high school mathematics competitions, including the **Saskatchewan Math Challenge** (until 2013) and the **Canadian Math Kangaroo** contest (as of 2014). Note that COVID-19 disrupted many on-campus activities after March 2020.

Department members have regularly contributed to events organized by the Faculty of Science. Faculty have served as judges at annual **Science Fairs**, have lead a "UR a scientist" workshop at the Canada-wide Science Fair in 2017, have volunteered and hosted activities at the Faculty of Science **Science Rendezvous** days, and have organized sessions at the University of Regina **Summer Science Camp** (2011-2014) and the **Mother Theresa Middle School Science Camp** (2015, 2016). The Department has also been involved in community service initiatives with a focus on indigenous students, such as preparing mathematics related content for students at the **Treaty 4 Gathering** (2019, 2021), and organizing mathematics and coding activities for the **Science Camps for Saskatchewan Indigenous Youth** in Fort Qu'Appelle and Regina (2021, 2022).

Department members have organized numerous initiatives directly with elementary and secondary schools and teachers. These include class room visits in schools as guest speakers on math enrichment activities, mock lectures on various topics in pre-calculus and calculus as well as on university preparedness. Faculty have also met with groups of teachers at the Regina Public School board office (known as the **Math Teachers Activity Group**) to discuss challenges and opportunities for high school students transitioning to university. Conversely, we have hosted grade 12 classes on campus to attend a first year math class and provide them with a tour of our campus. Finally, we have invited math teachers to the department to engage in conversation in an effort to strengthen the partnership between high school math teachers and the department here at the University of Regina. In addition, **Math Central** is an ongoing collection of internet resources and services for K-12 students, teachers and parents. This includes the Quandaries and Queries question and answer database and **Mathematics with a Human Face**, which highlights mathematicians and their varied careers.

For current undergraduate students, the Mathematics, Actuarial Science, Statistics student society (MASS) organizes a yearly **Pi Day** event, which includes lectures by faculty members and free pie. The department also hosts **Pre-Calculus seminars** at the start of the academic year. These seminars are specifically designed to help high school graduates transition to college-level Mathematics. They provide a comprehensive overview of the key concepts and skills needed for success in calculus and other advanced Mathematics courses.

5. PROGRAMS OFFERED

5.1 Programs

Undergraduate Programs

The Department of Mathematics and Statistics offers a wide range of undergraduate programs, including Actuarial Science, Data Science, Mathematics and Statistics (see Appendix I and II for the calendar description of the undergraduate programs and courses offered). These programs are designed to provide students with a comprehensive understanding of the mathematical and statistical concepts and methods that are essential for success in a variety of fields. Additionally, the department offers a number of combined programs in collaboration with other departments, such as Computer Science, Economics and Education, to provide students with a broader perspective and diverse skill set.

1. BSc in Data Science (new program, started in the Fall of 2022)
2. BSc in Mathematics
3. BSc Honours in Mathematics
4. BSc with Combined Major in Computer Science and Mathematics
5. BSc Honours with Combined Major in Computer Science and Mathematics
6. BSc with Major in Applied Mathematics and Statistics
7. BSc in Statistics*
8. BSc Honours in Statistics* (new program, started in the Fall of 2022)
9. BSc with Combined Major in Statistics and Economics
10. BSc in Actuarial Science**
11. Minor in Applied Mathematics
12. Minor in Pure Mathematics
13. Minor in Statistics
14. Certificate in Statistics
15. Co-operative Education Programs in Mathematics and Statistics
16. Internship Program in Actuarial Science
17. Five-Year BEd/BSc Secondary Mathematics Program Resulting in Two Degrees

Graduate Programs

The Department of Mathematics and Statistics offers graduate programs at the Master's and Doctoral level, with specialization in Mathematics and Statistics (see Appendix III for the calendar description of the graduate courses offered).

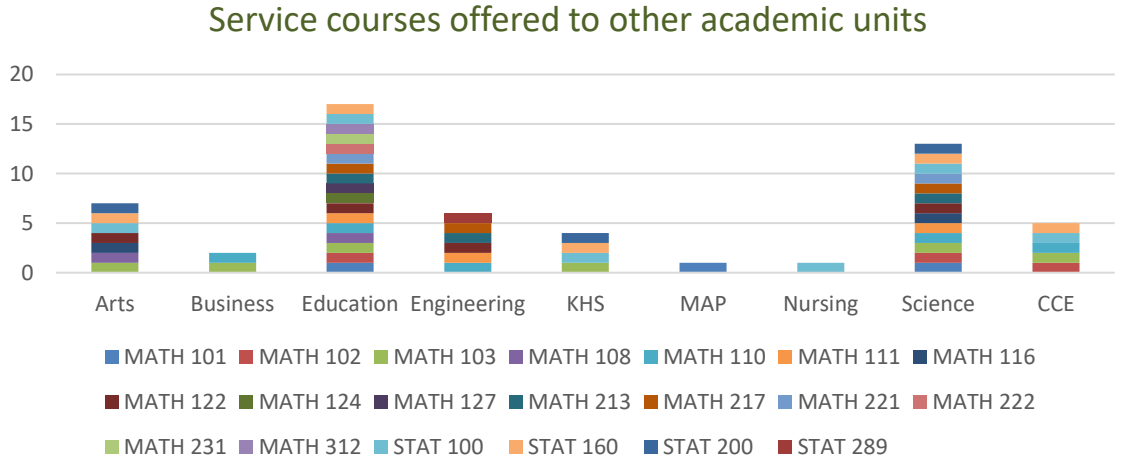
1. MSc in Mathematics (thesis-based)
2. MSc in Mathematics (course-based)
3. MSc in Statistics (thesis-based)
4. MSc in Statistics (course-based)
5. PhD in Mathematics
6. PhD in Statistics

* Applied for accreditation by the Statistical Society of Canada.
** Fully accredited by the Canadian Institute of Actuaries. Accredited at the UCAP-IC level by the Society of Actuaries.

5.2 Service teaching in support of other programs

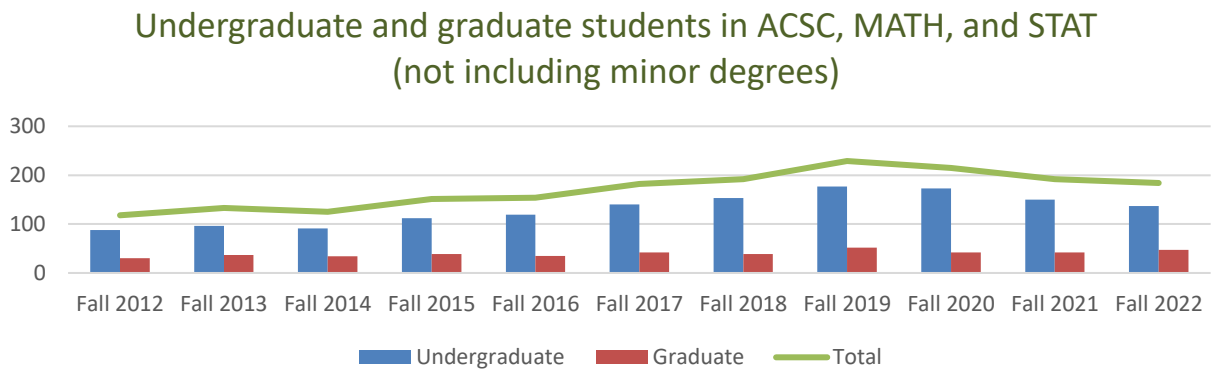
The Department of Mathematics and Statistics provides service teaching to support other programs by offering courses in Mathematics and Statistics that are required for students in other disciplines, such as Arts, Business Administration, Education, Engineering and Applied Science, Kinesiology and Health Studies, Media, Art and Performance, Nursing, and Science. These courses help students develop the mathematical and statistical skills necessary for success in their chosen field. Additionally, the department offers elective courses that are open to students from certain programs.

Course number	Beneficiary academic units
MATH 101	Education, MAP, Science
MATH 102	Science, Education (elective), CCE (elective)
MATH 103	Arts, Business Administration, Education, KHS, Science, CCE
MATH 108	Arts, Education
MATH 110	Business Ad., Education, Engineering and Applied Science, Science, CCE
MATH 111	Education, Engineering and Applied Science, Science
MATH 116	Arts, Science
MATH 122	Arts (elective), Education, Engineering and Applied Science, Science
MATH 124	Education
MATH 127	Education
MATH 213	Education, Engineering and Applied Science, Science
MATH 217	Education, Engineering and Applied Science, Science
MATH 221	Education, Science
MATH 222	Education
MATH 231	Education
MATH 312	Education
STAT 100	Arts, Business Ad., Education, KHS, Nursing, Science, CCE
STAT 160	Arts, Education, KHS, Science, CCE
STAT 200	Arts, KHS, Science
STAT 289	Engineering and Applied Science



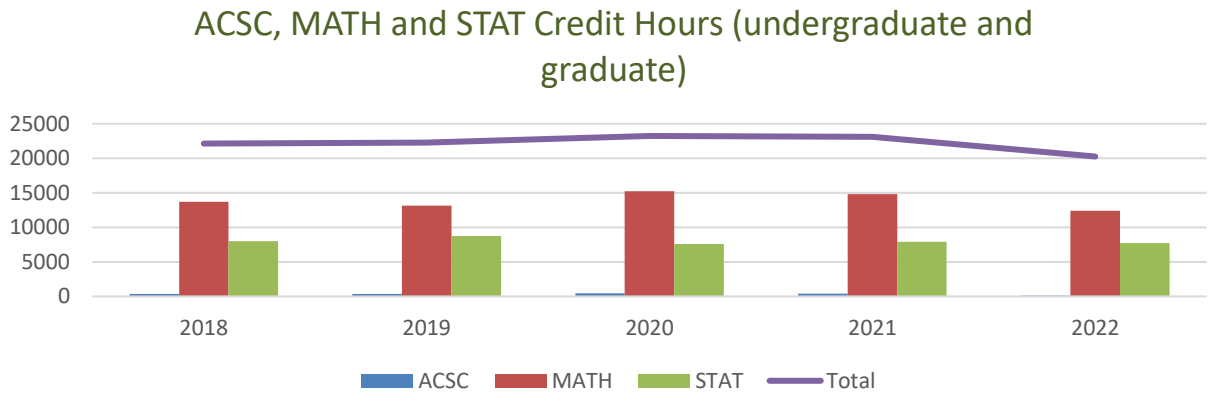
5.3 Enrollment trends

The Department of Mathematics and Statistics has experienced significant growth in enrollment in its major programs over the past decade. Between Fall 2012 and Fall 2019, there was a 94.06% increase in the number of students enrolled, from 118 to 229. However, the COVID-19 pandemic has led to a 19.65% decline in enrollment from Fall 2019 to Fall 2022. Overall we experienced a 55.93% increase from Fall 2012 to Fall 2022, from 118 to 184. We expect to return to higher, pre-COVID-19 level growth in the next few years.



Based on current growth trends, the launch of a new Data Science program in Fall 2022, and the expansion and consolidation of existing programs, the Department of Mathematics and Statistics expects a significant increase in enrollment over the next decade. More specifically, the department estimates that the total number of students will increase by at least 50%, with the majority of this growth occurring at the undergraduate level. Additionally, the department expects at least a 15% increase in the number of graduate students.

The number of credit hours (CH) for ACSC, MATH, and STAT courses increased by 4.52% between 2018 and 2020, from 22,115 CH to 23,116 CH. However, this number decreased by 8.41% from 2021 to 2022, from 23,116 CH to 20,256 CH, as a result of a general drop in enrollment at the University of Regina and the impact of a high number of service courses offered by the Department of Mathematics and Statistics on its overall total credit hours offered.



5.4 Successes

Major Student Awards

- 2022 Distinguished Professional Achievement Award: Kathie Cameron (BScHons'76). Dr. Kathie Cameron is a professor in the Mathematics Department at Wilfrid Laurier University.
- 2022 President's medal: Sarobidy Razafimahatratra (PhD Mathematics 2022).
- 2022 Governor General's Academic Silver Medal: Kendra Ashley Lemieux (BSc Computer Science and Math 2022).
- 2021 Alumni Crowning Achievement Award for Outstanding Young Alumni: Sarah Plosker (M.Sc. 2010). Dr. Plosker is a Canadian Research Chair and Professor at Brandon University.
- 2020 Outstanding Young Alumni and recipient of the President's Medal: Christine Selinger (BEd'11, BSc'11).
- 2020 Dean's Medal and University Prize in Science: Nicole Malinowski (BSc. Actuarial Science, 2020).
- 2018 Governor General's Gold Medal at the University of Waterloo: Sam Jaques, BSc Honours (Math).
- 2018 Faculty of Science Dean's Medal: Charlayna McGill (BSc. in Actuarial Science 2018).
- 2018 Governor General's Academic Gold Medal: Thuntida Ngamkham (PhD Stat, 2018).
- 2017 Governor General's Academic Gold Medal: Marzieh Bayeh (PhD Math, 2017).
- 2015 Top paper in the Canadian Mathematical Bulletin: Ruhi Ahmadi (and B. Gilligan).

NSERC Scholarships

(i) NSERC USRA

- 2022-2023: A. Cody, R. Tehara, P. Wadel, Y. Shah, A. Norris.
- 2021-2022: K. Lemieux, J. Parenteau, R. Tehara.
- 2020-2021: B. Eidsness, K. Lemieux, J. Parenteau.
- 2019-2020: Z. Kish, M. Muhammad-Anwar, J. Parenteau, J. Zerr.
- 2018-2019: K. Blanchette, M. Muhammad-Anwar, A. Nau, J. Zerr.
- 2017-2018: K. Blanchette, E. Lekach, M. Muhammad-Anwar, A. Nau, T. Stanley.
- 2016-2017: K. Thompson.
- 2015-2016: D. Krumer, C. McGill.
- 2014-2015: A. Dyck, A. Gorr, D. Krumer, C. McGill, T. Petrie.
- 2013-2014: A. Dyck, D. Johnstone, D. Palmarin, T. Petrie, L. Richards.

(ii) Alexander Graham Bell Canada Graduate Scholarships - Master's

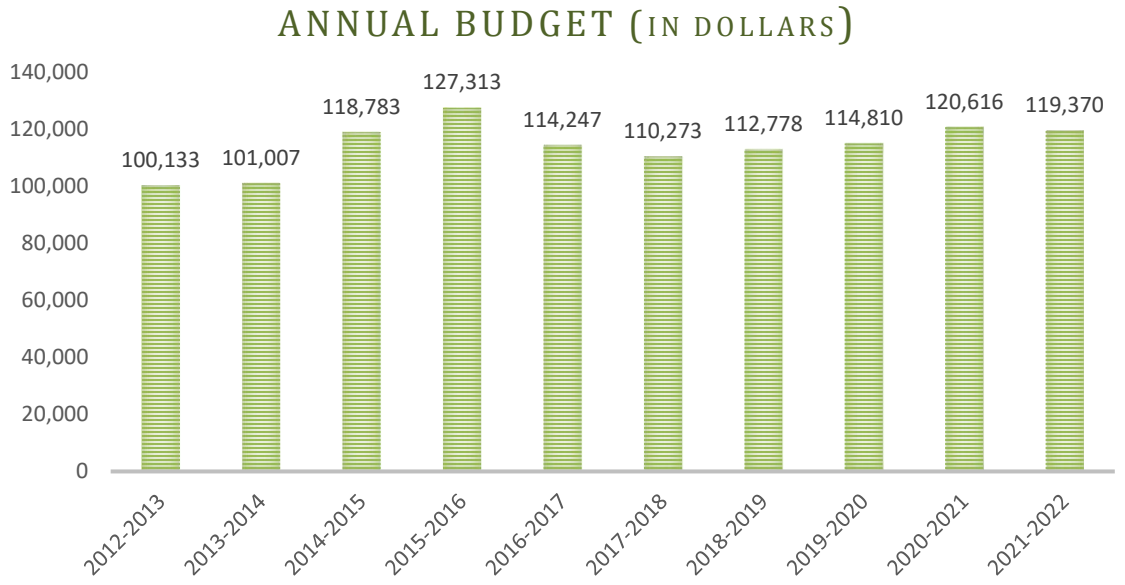
- 2015-2016: A. Gorr.
- 2016-2017: D. Krumer.

(iii) Postgraduate Scholarships

- 2022-2024: M. Alexander (PGS-D).
- 2022-2023: J. Parenteau (PGS-M).
- 2013-2014: A. Purdy (PGS-D).

6. Unit Budget

The yearly budget of the Department of Mathematics and Statistics is determined entirely by the Faculty of Science. The department's aggregated budget for fiscal years 2012-2021 is presented below, based on information provided by the university's financial software known as FAST. For more details, please see Appendix IV.



Fiscal Year	Revenue*	Salaries* (TAs and markers), benefits and awards	Expenditures*	Transfers**	Total Revenues less Expenses and Transfers
2021-2022	184,489.7	174,711.05	23,156.01	- 25,684.89	12,307.53
2020-2021	135,615.67	221,039.78	24,495.77	- 32,037.02	-77,882.86***
2019-2020	168,052.38	164,846.22	53,143.51	-36,434.96	-13,502.39
2018-2019	158,058.25	123,710.25	31,847.92	-5,521.26	8,021.34
2017-2018	148,061.73	102,000.41	43,507.44	847.61	1,706.27
2016-2017	160,135.72	166,779.36	28,496.61	- 35,555.00	414.75
2015-2016	155,900.32	135,243.39	41,036.79	- 36,782.00	16,402.14
2014-2015	158,408.24	140,147.33	38,603.99	- 57,409.46	37,066.38
2013-2014	149,611.38	90,729.00	34,126.53	3,331.45	21,424.40
2012-2013	137,137.47	123,922.99	45,698.34	-22,532.84	- 9,951.02

*See Appendix IV; **Transfers to/from General Operating, Capital, Research, and Sundry Projects; ***Does not include cost recoveries (TA costs) paid by Luther and Campion Colleges.

7. SWOT Analysis (strengths, weaknesses, opportunities, threats)

Strengths

(i) The department has established a reputation for excellence in research. This is evidenced by the significant number of publications that department members have contributed to reputable, high-impact journals. Additionally, the department has been successful in securing funding for their research from various sources, including NSERC, PIMS and Mitacs. The department also fosters a culture of collaboration, both within the department and with researchers from other universities. This is demonstrated by the numerous collaborative projects and partnerships with researchers at other universities, as well as the organization of conferences at the University of Regina that bring together researchers from across the country and beyond. Overall, the department has built a strong research profile and is well-respected in the academic community.

(ii) Undergraduate students have a wide range of choices in their programs, including the opportunity to enrol in co-op and internship programs. These programs provide students with the opportunity to gain hands-on experience and apply what they have learned in the classroom to real-world settings. At the higher level, our smaller class sizes provide students with a more personalized learning experience. This allows students to work closely with professors, who serve as mentors and guides. This kind of mentorship can be incredibly valuable in helping students to develop their skills and achieve their goals. In many cases, this mentorship can lead to honours supervision, where students work on independent research projects under the guidance of a professor. This experience can also help students prepare for graduate level work, as they will have already gained experience in research and scholarship.

(iii) Our graduate program has undergone significant improvement since the last Academic Unit Review, and this is reflected in the numerous awards and accolades earned by our graduate students. These achievements are a testament to the quality of education and research opportunities provided by the program. In the past decade alone, our graduate students have won two Governor General's Gold Medals and one President's Medal. The program is designed to provide students with the tools and skills they need to excel in their chosen field and make meaningful contributions to their discipline. These awards and accolades not only reflect the hard work and dedication of our graduate students but also demonstrate the effectiveness of our program in producing highly accomplished scholars and researchers.

(iv) The department has a strong reputation for providing high-quality service teaching to multiple other departments and faculties at the university. This includes offering courses and support in the department's area of expertise, as well as providing resources and expertise for other departments to enhance their own curriculum. Overall, the department is committed to providing valuable contributions to the university community and to fostering a culture of interdisciplinary collaboration.

(v) The department is deeply involved in the university and wider community, and its members take an active role in shaping the direction of the institution and making a positive impact on the community. The department is committed to fostering a culture of engagement and service, and members are encouraged to participate in these activities.

The department has set up a number of programs and initiatives that allow members to get involved in the community and to make a difference. These include volunteering at local schools, participating in community service projects, and working with local organizations to address social issues. Through these activities, members of the department are able to make a meaningful impact on the lives of others and to contribute to the well-being of the community.

Weaknesses

(i) The department has encountered challenges in recruiting domestic graduate students. Despite the department's strong research profile and the opportunities for professional development and collaboration that it offers, it has been difficult to attract students from other provinces to study and work in Regina. This suggests that more effort needs to be made in order to promote the department and the University of Regina as an attractive destination for domestic graduate students.

To address this issue, the department may consider implementing a targeted marketing and recruitment strategy aimed at students in other provinces. This could involve increasing the department's visibility at academic conferences and events outside of Regina, developing relationships with academic departments at other universities, and providing more detailed information about the department and the University of Regina on the department's website. Additionally, the department may also consider offering more competitive financial packages for graduate students, as well as providing more opportunities for networking and professional development for students.

(ii) Assessing the background and research potential of international graduate students can be a challenging task for the department. The department faces difficulties in determining the level of academic preparedness and research aptitude of international students, which can result in some students starting a graduate program without the necessary background and without a clear plan for how to address any gaps.

To address this issue, the department may consider implementing a more comprehensive and standardized evaluation process for international students. This could involve requiring additional documentation or testing from international students to better assess their qualifications, or conducting personal interviews with international students to gain a better understanding of their research interests and goals. Additionally, the department may also consider offering additional support and resources for international students to help them overcome any gaps in their academic background and to help them succeed in the graduate program.

(iii) The department is currently facing a significant disadvantage in comparison to other Mathematics and Statistics departments across Canada due to the lack of an in-house funded postdoctoral program, particularly in Statistics. Postdoctoral positions are an essential component of a research-active department as they provide opportunities for recent PhD graduates to continue their research training, gain additional experience and establish themselves as independent researchers. They also play a key role in mentoring and training graduate students, as well as in fostering collaboration and knowledge exchange within the department.

Opportunities

(i) The department has recently established a new Data Science program in collaboration with the Department of Computer Science. This program is expected to provide a new and attractive route for recruiting new students into the department. The increasing demand for professionals with Data Science skills in various sectors has made the data science field an attractive option for students. By offering a program in Data Science, the department can attract students who are interested in using mathematical and computational methods to extract insights and knowledge from data, which is a fundamental skill in many industries.

The success of the Data Science program will be a key factor in determining whether the department should consider developing a graduate program in Data Science in the future. If the program proves to be popular among students and results in a significant increase in enrollment, the department may consider developing a graduate program in Data Science to meet the growing demand for advanced training in this field. This could provide students with an opportunity to specialize in data science and conduct research in this field, which would be an attractive option for students who are interested in pursuing a career in Data Science or academia.

(ii) The department has recently launched a Statistical Consulting Centre, which is designed to provide opportunities for students and faculty to interact with industry and the wider community. The center is a valuable resource for both students and faculty, as it allows them to apply their knowledge and skills to real-world problems, and to gain valuable experience working on projects for clients. The centre also serves as a bridge between the academic and industrial sectors, connecting the department with industry partners and providing opportunities for collaboration and knowledge exchange.

The center may also provide a source of revenue for the department in the future, as clients may be willing to pay for the services provided by the center. This can help to support the department's research and education activities and contribute to its overall financial stability.

(iii) The department has the potential to be an effective contributor to Canada's National Quantum Strategy due to its expertise in Quantum Information, Mathematical Physics and other areas that are critical for the development of quantum technologies.

Firstly, the department's research in Quantum Information and Mathematical Physics can be used to contribute to the development of quantum algorithms and software, in collaboration with the Department of Computer Science. The department's expertise in these areas can support the development of new mathematical models and algorithms that can be applied to a variety of quantum technologies, such as quantum computing, quantum communication and quantum cryptography. Secondly, the department can also contribute to the development of quantum-safe cryptography and secure communication protocols. The increasing use of quantum computers will make current encryption methods vulnerable, and the department's expertise in Mathematics and Cryptography can help to develop new methods to ensure the security of data and communications in the quantum era.

Threats

(i) Insufficient funding for graduate students can have a number of negative effects on our graduate program. One major issue is that it can make it difficult to attract and retain top students. Strong

students often have multiple options for graduate programs, and they may choose to attend larger universities where more funding is available. This can lead to a loss of top talent for the program, which can have a detrimental impact on the quality and competitiveness of the program. Another issue that can arise from insufficient funding is that department members may be forced to make difficult choices between limiting the number of students they can accept, and providing sufficient funding for the students they do accept. This can lead to a smaller, less diverse, and less competitive student body. Furthermore, limiting the number of students can also decrease the number of funding opportunities, which leads to a vicious cycle.

To address these issues, it is important to secure more funding for graduate students. For example, offering tuition waivers or more scholarships can help attract and retain top students, improve the overall quality of the program, and ensure that students have the resources they need to succeed. Providing funding for research and travel opportunities to attend conferences, workshops, and symposiums can also be beneficial for students, as it would aid them in gaining professional experience and building networks. Furthermore, providing more funding for students to work as teaching or research assistants can also be beneficial as it would provide them with hands-on experience in their field.

(ii) Having a single lab instructor and only one computer lab space can be a significant threat to multiple programs that rely on a computer lab component. This is because it can limit the number of students who can access the lab and the resources it provides. With a single lab instructor, there is a risk that the lab will be overbooked, and students may not be able to access the lab when they need it. This can cause delays in completing coursework and can negatively impact students' ability to meet course requirements. This situation is further exacerbated by the anticipated increase in the number of students enrolled in the newly established Data Science program. As the program becomes more popular and attracts more students, the demand for lab resources will increase, putting even more pressure on the existing lab instructor and lab space.

To address this issue, it is crucial to have a second lab instructor and more lab space. Having a second lab instructor would allow for more flexibility in scheduling and more opportunities for students to access the lab. This would ensure that students are able to complete their coursework and meet their course requirements. Additionally, more lab space would allow for more students to be in the lab at the same time and would reduce the pressure on the existing lab resources.

(iii) The current size of our teaching staff can have a significant impact on the ability of our department to offer a full complement of undergraduate and graduate courses. This is particularly concerning in the case of programs such as Statistics or Actuarial Science, which rely heavily on specialized knowledge and skills. Losing a teaching position in these fields can create a significant gap in the department's expertise and ability to offer certain courses. This can lead to a shortage of qualified instructors, which can result in the department having to rely heavily on sessional instructors, who may not have the same level of expertise or experience as regular faculty members. To mitigate this issue, it is important for the department to have a plan in place to address any potential losses in teaching staff. This could include recruiting and hiring new faculty members in a timely manner, developing a pool of qualified sessional instructors, or finding other ways to ensure that the department has the necessary expertise and resources to offer its programs without heavy reliance on sessional instructors.

APPENDIX I – MATHEMATICS AND STATISTICS PROGRAMS (CALENDAR DESCRIPTION)

1. BSC IN DATA SCIENCE

Credit hours	BSc in Data Science Required Courses
0.0	SCI 099
3.0	CS 110
3.0	CS 115
3.0	CS 210
3.0	CS 215
3.0	CS 265
3.0	CS 280
3.0	CS/MATH 261
3.0	CS 310
3.0	CS 320
3.0	CS 340
3.0	CS 375
3.0	CS 412
3.0	CS 465
3.0	MATH 110
3.0	MATH 111
3.0	MATH 122
3.0	MATH 221
3.0	STAT 160
3.0	STAT 251
3.0	STAT 252
3.0	STAT 300
3.0	STAT 301
3.0	STAT 354
3.0	STAT 418
9.0	Three MATH, STAT, or CS courses at the 300-level or higher
3.0	CS/STAT 496
84.0	Subtotal: 65.00% Major GPA required
3.0	ENGL 100
3.0	ENGL 110
6.0	Two Natural Science electives
12.0	Four Arts, La Cité, or Media, Art, and Performance electives
12.0	Four Open electives
120.0	**Total: 65.00% Program GPA required**

2. BSc IN MATHEMATICS

Credit hours	BSc in Mathematics Required Courses
0.0	SCI 099
3.0	MATH 110
3.0	MATH 111
3.0	MATH 122
3.0	MATH 213
3.0	MATH 217
3.0	MATH 221
3.0	MATH 222
3.0	MATH 223
3.0	MATH 305
3.0	MATH 312
3.0	MATH 313
3.0	STAT 160
3.0	MATH 300- or 400-level
3.0	MATH 300- or 400-level
3.0	MATH 251 or STAT 251
3.0	MATH or STAT above 250 or ACSC any level
3.0	CS 110
51.0	Subtotal: 65.00% Major GPA required
3.0	ENGL 100
3.0	ENGL 110
12.0	Four Arts, La Cité, or Media, Art, and Performance electives
6.0	Two Natural Science electives
15.0	Five Science electives
12.0	Four Science, Arts, La Cité, or Media, Art, and Performance electives
18.0	Six Open electives
120.0	**Total: 65.00% Program GPA required**

3. BSc Honours in Mathematics

Credit hours	Honours BSc in Mathematics Required Courses
0.0	SCI 099
3.0	MATH 110
3.0	MATH 111
3.0	MATH 122
3.0	MATH 213
3.0	MATH 217
3.0	MATH 221
3.0	MATH 222
3.0	MATH 223
3.0	MATH 305
3.0	MATH 312
3.0	MATH 313
3.0	MATH 323
3.0	MATH 251 or STAT 251
3.0	MATH 200-, 300-, or 400-level
3.0	MATH 200-, 300-, or 400-level
3.0	MATH 200-, 300-, or 400-level
3.0	MATH 200-, 300-, or 400-level
3.0	MATH 200-, 300-, or 400-level
3.0	MATH 200-, 300-, or 400-level
3.0	MATH 200-, 300-, or 400-level
3.0	MATH 200-, 300-, or 400-level
0.0	MATH 497
0.0	MATH 498
3.0	MATH 400-level
3.0	MATH 400-level
3.0	CS 110
3.0	STAT 160
72.0	Subtotal: 75.00% Major GPA required
3.0	ENGL 100
3.0	ENGL 110
12.0	Four Arts, La Cité, or Media, Art, and Performance electives
6.0	Two Natural Science electives
9.0	Three Science electives
15.0	Five Open electives
120.0	**Total: 70.00% Program GPA required**

4. BSc Combined Major in Computer Science and Mathematics

Credit hours	BSc Combined Major in Computer Science and Mathematics Required Courses
0.0	SCI 099
3.0	CS 110
3.0	CS 115
3.0	CS 201
3.0	CS 210
3.0	CS 215
3.0	CS or MATH 261
3.0	CS 310
3.0	CS 320
3.0	CS 340
3.0	CS or MATH 361
3.0	MATH 110
3.0	MATH 111
3.0	MATH 122
3.0	MATH 213
3.0	MATH 217
3.0	MATH 221
3.0	MATH 222
3.0	MATH 223
3.0	MATH 305
3.0	MATH 312
3.0	MATH 327
3.0	STAT 160 or 200
3.0	Three courses from: MATH 301, 322, 323, 329, 381; CS 350, 410, 411, 412
3.0	
3.0	
75.0	Subtotal: 65.00% Major GPA required
3.0	ENGL 100
3.0	ENGL 110
12.0	Four Arts, La Cité, or Media, Art, and Performance electives
6.0	Two Natural Science electives
6.0	Two Science, Arts, La Cité, or Media, Art, and Performance electives
15.0	Five Open electives
120.0	**Total: 65.00% Program GPA required**

5. BSc Honours Combined Major in Computer Science and Mathematics

Credit hours	BSc Honours Combined Major in Computer Science and Mathematics Required Courses
0.0	SCI 099
3.0	CS 110
3.0	CS 115
3.0	CS 201
3.0	CS 210
3.0	CS 215
3.0	CS 261 or MATH 261
3.0	CS 310
3.0	CS 320
3.0	CS 340
3.0	CS 361 or MATH 361
3.0	CS 412
0.0	CS 498 or MATH 497
0.0	CS 499 or MATH 498
3.0	MATH 110
3.0	MATH 111
3.0	MATH 122
3.0	MATH 213
3.0	MATH 217
3.0	MATH 221
3.0	MATH 222
3.0	MATH 223
3.0	MATH 305
3.0	MATH 312
3.0	MATH 313
3.0	MATH 327
3.0	STAT 160 or 200
3.0	Two courses from: MATH 322, 323, 329, 427; CS 410, 411
3.0	
3.0	MATH 301, 381, CS 350, or 461
3.0	MATH 301, 381, CS 350, or 461
3.0	MATH 400-level or CS 400-level
3.0	MATH 400-level or CS 400-level
90.0	Subtotal: 75.00% Major GPA required
3.0	ENGL 100
3.0	ENGL 110
12.0	Four Arts, La Cité, or Media, Art, and Performance electives
6.0	Two Natural Science electives
6.0	Two Open electives
120.0	**Total: 70.00% Program GPA required**

6. BSc WITH MAJOR IN APPLIED MATHEMATICS AND STATISTICS

Credit hours	BSc with Major in Applied Mathematics and Statistics Re-quired Courses
0.0	SCI 099
3.0	MATH 110
3.0	MATH 111
3.0	MATH 122
3.0	MATH 213
3.0	MATH 217
3.0	MATH 221
3.0	MATH 312
3.0	MATH 381
3.0	STAT 160 or 200
3.0	STAT 251
3.0	STAT 252
3.0	STAT 354
3.0	STAT 300- or 400-level
3.0	STAT 300- or 400-level
3.0	STAT 300- or 400-level
3.0	MATH 300- or 400-level, or STAT 300- or 400-level
3.0	MATH 300- or 400-level, or STAT 300- or 400-level
3.0	MATH 300- or 400-level, or STAT 300- or 400-level
3.0	MATH 400-level or STAT 400-level
3.0	CS 110
3.0	CS 261 or MATH 261
63.0	Subtotal: 65.00% Major GPA required
3.0	ENGL 100
3.0	ENGL 110
12.0	Four Arts, La Cité, or Media, Art, and Performance electives
6.0	Two Natural Science electives
9.0	Three Science electives
6.0	Two Science, Arts, La Cité, or Media, Art, and Performanceelectives
18.0	Six Open electives
120.0	**Total: 65.00% program GPA required**

7. BSc in Statistics

Credit hours	BSc in Statistics Required Courses
0.0	SCI 099
3.0	CS 110
3.0	MATH 110
3.0	MATH 111
3.0	MATH 122
3.0	MATH 213
3.0	STAT 160 or 200
3.0	STAT 251
3.0	STAT 252
3.0	STAT 351
3.0	STAT 354
3.0	STAT 357
3.0	STAT 452
3.0	STAT 485
12.0	Four courses from: STAT 300, 362, 384, 386, 418, 426, 441,451, 454, 456, 495–498
51.0	Subtotal: 65.00% Major GPA required
3.0	ENGL 100
3.0	ENGL 110
12.0	Four Arts, La Cité, or Media, Art, and Performance electives
6.0	Two Natural Science electives
15.0	Five Science electives
15.0	Five Science, Arts, La Cité, or Media, Art, and Performance electives
15.0	Five Open electives
120.0	**Total: 65.00% Program GPA required**

8. BSc Honours in Statistics

Credit hours	BSc (Hons) in StatisticsRequired Courses
0.0	SCI 099
3.0	MATH 110
3.0	MATH 111
3.0	MATH 122
3.0	MATH 213
3.0	MATH 217
3.0	MATH 221
3.0	MATH/CS 261
3.0	CS 110
3.0	CS 265
3.0	STAT 160
3.0	STAT 251
3.0	STAT 252
3.0	STAT 300
3.0	STAT 301
3.0	STAT 351
3.0	STAT 354
3.0	STAT 357
3.0	STAT 362
3.0	STAT 452
3.0	STAT 489
6.0	Two STAT courses at the 200-, 300- or, 400-level
9.0	Three STAT courses at the 400-level
0.0	STAT 497
0.0	STAT 498
75.0	Subtotal: 75.00% Major GPA required
3.0	ENGL 100
3.0	ENGL 110
6.0	Two Natural Science electives
9.0	Three Science electives
12.0	Four Arts, La Cité, or Media, Art, and Performance electives
12.0	Four Open electives
120.0	**Total: 70.00% Program GPA required**

9. BSc WITH COMBINED MAJOR IN STATISTICS AND ECONOMICS

For the purposes of this combined degree only, Economics courses cannot be used to fulfill the requirement of 18 credit hours inArts, or Media, Art, and Performance. For more information refer to the Department of Economics.

Credit hours	BSc Combined Major in Statistics and Economics Required Courses
0.0	SCI 099
3.0	MATH 110
3.0	MATH 111
3.0	MATH 122
3.0	MATH 213
3.0	STAT 160, 200, or 289
3.0	STAT 251
3.0	STAT 252
3.0	STAT 351
3.0	STAT 354
3.0	STAT 300-or 400-level
3.0	STAT 300-or 400-level
3.0	STAT 300-or 400-level
3.0	MATH 200-, 300- or 400-level; STAT 200-, 300-or 400-level; or ACSC any level
3.0	ECON 201
3.0	ECON 202
3.0	ECON 301
3.0	ECON 302
3.0	ECON 307
3.0	ECON 310
3.0	ECON 321
3.0	ECON 322
3.0	ECON any level
3.0	ECON any level
3.0	CS 110
72.0	Subtotal: 65.00% major GPA required
3.0	ENGL 100
3.0	ENGL 110
12.0	Four Arts, La Cité, or Media, Art, and Performance electives
6.0	Two Natural Science electives
18.0	Six Science electives
6.0	Two Open electives
120.0	**Total: 65.00% program GPA required**

10. BSc in Actuarial Science

By completing four internships (ACSC 041, 042, 043 and 044) as well as the requirements listed below a student may receive the BSc in Actuarial Science (with Internship).

Credit hours	BSc in Actuarial Science Required Courses
0.0	SCI 099
3.0	MATH 110
3.0	MATH 111
3.0	MATH 122
3.0	MATH 213
3.0	CS 261 or MATH 261
3.0	STAT 160 or 200
3.0	STAT 251
3.0	STAT 252
3.0	STAT 351
3.0	STAT 354
3.0	MATH, STAT, or ACSC 300- or 400-level
3.0	ACSC 116 or MATH 116
3.0	ACSC 216 or MATH 216
3.0	ACSC 217 or STAT 217
3.0	ACSC 316 or MATH 316
3.0	ACSC 317 or STAT 317
3.0	ACSC 318 or STAT 318
3.0	ACSC 417
3.0	ACSC 418 or STAT 418
3.0	ACSC 419
3.0	ACSC 456 or STAT 456
3.0	ECON 201
3.0	ECON 202
3.0	BUS 285
3.0	BUS 395
3.0	CS 110
78.0	Subtotal: 65.00% Major GPA required
3.0	ENGL 100
3.0	ENGL 110
6.0	Two Arts, La Cité, or Media, Art, and Performance electives
6.0	Two Natural Science electives
9.0	Three Science electives (Not ACSC)
3.0	One Science, Arts, La Cité, or Media, Art, and Performance elective
12.0	Four Open electives
120.0	**Total: 65.00% Program GPA required**

11. MINOR IN APPLIED MATHEMATICS

Credit hours	Minor in Applied MathematicsRequired Courses
3.0	MATH 213
3.0	MATH 222
3.0	MATH 261
3.0	MATH 312
3.0	Two of MATH 322, 327, 329, 361, or 381
3.0	
18.0	**Subtotal**

12. MINOR IN PURE MATHEMATICS

Credit hours	Minor in Pure MathematicsRequired Courses
3.0	MATH 213
3.0	MATH 221
3.0	MATH 223
3.0	MATH 305
3.0	Two of MATH 312, 313, 321, 323, 381
3.0	
18.0	**Subtotal**

13. MINOR IN STATISTICS

Credit hours	Minor in Statistics Required Courses
3.0	STAT 160 or 200
3.0	STAT 251
3.0	STAT 252
3.0	STAT 351
3.0	STAT 354
3.0	STAT 300, 357, 362, 384, or 386
18.0	**Subtotal**

14. CERTIFICATE IN STATISTICS

Credit hours	Certificate in Statistics Required Courses
0.0	SCI 099
3.0	CS 110
3.0	MATH 110
3.0	MATH 111
3.0	MATH 122
3.0	STAT 160
3.0	STAT 251
3.0	STAT 252
3.0	STAT 354
3.0	STAT 300- or 400-level
3.0	STAT 300- or 400-level
30.0	**Total 65.00% GPA required**

***Note**: Due to the prerequisite structure of the Certificate in Statistics, completion of the listed courses will require a minimum of four terms*

15. CO-OPERATIVE EDUCATION PROGRAMS IN MATHEMATICS AND STATISTICS

The Department of Mathematics and Statistics operates two 4-year degree programs in Co-operative university education. Each requires:

- Students to complete three work terms to earn the Co-op designation.
- A fourth work term is optional with the mutual agreement of the student, the Faculty, the Co-op Office, and an employer.

Mathematics Co-op Program:

Entrance Criteria - Students must:

- have and maintain a GPA of 65.00%;
- be enrolled in 12 credit hours to be a full-time Co-op student;
- complete three full terms of study including successful completion of MATH 110, 111, 122, 213, 217, CS 110, and STAT 160, before engaging in their first work term.

Statistics Co-op Program:

Entrance Criteria - Students must:

- have and maintain a GPA of 65.00%;
- be enrolled in 12 credit hours to be a full-time Co-op student;
- complete three full terms of study including successful completion of MATH 110, 111, 122, STAT 160, STAT 251, and CS 110 before engaging in their first work term.

16. INTERNSHIP PROGRAM IN ACTUARIAL SCIENCE

The Department of Mathematics and Statistics offers to students in the Actuarial Science program the possibility of participating in an internship year between years three and four of their academic study. The internship is 12 to 16 months in duration, with each four-month employment period worth one academic credit towards the degree. For further information, contact the Department of Mathematics and Statistics.

Entrance Criteria

At time of application to the internship program, students must

- have an overall average of at least 75.00%;
- plan to complete an actuarial exam before or during the internship placement;
- be enrolled full-time in the Actuarial Science program; and be enrolled in, or have completed ACSC 317.

At the time of placement into an internship position, students must:

- have completed ACSC 317 and ACSC 318.

Before going out on the internship, students must:

- have completed 72 credit hours towards the Actuarial Science.

17. FIVE-YEAR BED/BSC SECONDARY MATHEMATICS PROGRAMS

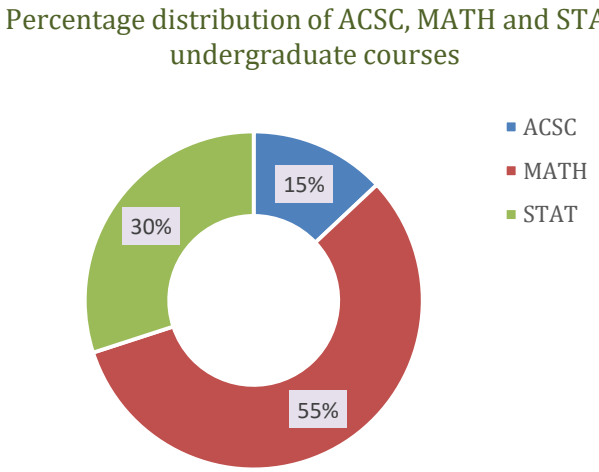
This program is designed to provide student teachers with the opportunity to gain a deeper understanding of mathematics and more flexible options in terms of pursuing two degrees. It will produce educators with enhanced specialization in mathematics.

Note: Students entering this program must consult with the Faculty of Science with regard to BSc requirements. Students require a teacher education minor to fulfill the requirements for the BEd. Students should consult with the Faculty of Education Office of Student Services to choose a minor. Students must choose one of the following minors to complete the program in the designated time: English Education, French Education, Music Education, Science Education, Social Studies Education, or Visual Education. The minor course requirements as listed in Secondary Education Program (Minors) section will be fulfilled in the Arts, or Media, Art, and Performance elective or in the Natural Science or science elective in terms 1, 2, 4, 6 or 7.

Five-Year BEd/BSc Secondary Mathematics Program Resulting in Two Degrees: BEd and BSc (Mathematics) (EMTI) (150 Credit Hours)	
Term 1 (Fall)	Term 2 (Winter)
ECS 101 (3) ENGL 100 (3) CS 110 (3) MATH 110 (3) Natural science elective* (3)	ECS 102 (3) MATH 111 (3) MATH 122 (3) Natural Science elective* (3) Minor* (3)
Term 3	Term 4
Open elective (3) ENGL 110 (3) MATH 213 (3) MATH 221 (3) STAT 160 (3)	ECS 303 (3) MATH 217 (3) MATH 222 (3) EMTH 200 (3) Minor* (3)
Term 5	Term 6
ECS 203 (3) EMTH 300 (major curriculum course) (3) MATH 223 (3) MATH or STAT above 250 or ACSC 116 (3) E (minor curriculum course) (3)	MATH 305 (3) MATH or STAT above 250 or ACSC216 (3) Arts, or Media, Art, and Perfor-mance elective (3) Minor* (3) Science elective (outside of major)* (3)
Term 7	Term 8
MATH 312 (3) Arts, or Media, Art, and Performance Elective (3) Minor* (3) Minor* (3) Arts, or Media, Art, and Performance Elective* (3)	ECS 310 (3) ECCU 400 (3) ECS 401 (3) EFLD 350 (0) EMTH 350 (major instr. course) (3) EMTH 351 (major educ. course) (3)
Term 9	Term 10
EFLD 400 (internship) (15)	EPSY 400 (3) MATH 300- or 400-level (3) MATH 300- or 400-level (3) Arts, or Media, Art, and Perfor-mance elective (3) Open elective (3)

APPENDIX II – UNDERGRADUATE COURSE DESCRIPTION

The Department of Mathematics and Statistics offers a total of 135 undergraduate courses, of which 20 are in Actuarial Sciences (ACSC courses), 75 are in Mathematics (MATH courses) and 40 are in Statistics (STAT courses).



1. ACTUARIAL SCIENCE COURSE DESCRIPTIONS

ACSC 041 - Actuarial Science Internship Term 1
First four month term of Actuarial Science Internship Program.

ACSC 042 - Actuarial Science Internship Term 2
Second Term of Actuarial Science Internship Program. *** Prerequisite: ACSC 041 ***

ACSC 043 - Actuarial Science Internship Term 3
Third term of Actuarial Science Internship Program. *** Prerequisite: ACSC 042 ***

ACSC 044 - Actuarial Science Internship Term 4
Fourth term of Actuarial Science Internship Program. *** Prerequisite: ACSC 043 ***

ACSC 116 - Mathematics of Finance I
This course provides a basis of financial mathematics. Topics include measurement of interest, basic and general annuities, yield rates, amortization schedules, and sinking funds. ***Prerequisite: MATH 103 or 110*** *Note: Students can receive credit for only one of MATH 116 and ACSC 116*

ACSC 216 - Mathematics of Finance II
This course is a continuation of Mathematics of Finance I and covers more advanced topics ranging from the theory of interest to principles of corporate finance. Specific topics include bonds, securities, analysis of risk and basic principles of pricing theory. ***Prerequisite: ACSC 116 or MATH 116*** *Note: Students can receive credit for only one of MATH 216 and ACSC 216*

ACSC 217 - Introduction to Actuarial Mathematics
Topics include: economics of insurance, applications of probability to problems of life insurance, life annuities, and life tables. ***Prerequisite: ACSC 116 or MATH 116, and STAT 251.*** *Note: Students may receive credit for only one of ACSC 217 or STAT 217.*

ACSC 300 - Statistical Learning and Predictive Modeling
Selected topics and techniques in statistical learning and predictive modeling, including linear models, logistic regression models, regression trees, classification models and statistical software. ***Prerequisite: MATH 122, STAT 252, and CS 110*** *Note: Students can receive credit for only one of ACSC 300 and STAT 300*

ACSC 316 - Mathematics of Finance III
This course covers the theory and pricing of financial derivatives such as Puts and Calls, with particular emphasis on the Black-Scholes model. ***Prerequisite: ACSC 216 or MATH 216, and STAT 251*** *Note: Students can receive credit for only one of MATH 316, STAT 316, and ACSC 316.*

ACSC 317 - Actuarial Models I
Probabilistic and deterministic contingency mathematics in life insurance and pensions. Topics include: benefit premiums, benefit reserves, multiple life functions, and multiple decrement models. ***Prerequisite: ACSC 217 or STAT 217*** *Note: Students may receive credit for only one of ACSC 317 or STAT 317*

ACSC 318 - Actuarial Models II
This course introduces collective risk models over an extended period. Stochastic processes are introduced, followed by definition and application of Markov chains. Introductory loss model material is also presented. ***Prerequisite: ACSC 317 or STAT 317*** *Note: Students may receive credit for only one of ACSC 318 or STAT 318*

ACSC 390AA - Canadian Pension Plan Review
A review of Canadian Pension Plans with an emphasis on actuarial mathematics.

ACSC 390AB - Intro. Stoch. Actuarial Models
An introduction to the use of Stochastic Models to solving actuarial problems. *** Prerequisite: ACSC 317 and STAT 351 ***

ACSC 390AC - Mathematics of Finance III - Derivative Pricing
Covers the pricing of European and American style options on investment vehicles including stocks, currencies, commodities and indices. Methods used include the Black-Scholes and binomial tree and other models. Interest rate models will also be covered. ***Prerequisite: ACSC 216 and STAT 251*** **Corequisite: ACSC 318**

ACSC 390AD - Topics in Property & Casualty Insurance
This class is intended to give students an introduction to Property and Casualty insurance and actuarial applications with respect to P&C insurers in Canada. Topics will be selected from the following: Products and Marketplace, Regulatory and Legal Environments, Underwriting, Actuarial Pricing models, Actuarial Valuation models, and Financial Reporting. ***Prerequisite: ACSC 217***

ACSC 416 - Introduction to Financial Enterprise Risk Management
This course aims to provide students with an introduction to financial enterprise risk management. Topics include risk classification, quantitative risk analysis, scenario generation, risk aggregation, risk measures and economic capital, and capital allocation. ***Prerequisite: ACSC 316.***

ACSC 417 - Introduction to Casualty Insurance and Credibility
An introduction to property/casualty loss reserving techniques. Topics include: reserves in casualty insurance, ratemaking process, credibility and ruin theory. ***Prerequisite: ACSC 317.***

ACSC 418 - Time Series Analysis and Forecasting
This course aims to introduce various statistical models for time series and cover the main methods for analysis and forecasting. Topics include: Deterministic time series: Trends and Seasonality; Random walk models; Stationary time series: White noise processes, Autoregressive (AR), Moving Average (MA), Autoregressive Moving Average (ARMA) models; Estimation, Diagnosis and Forecasting with various time series models; computer programming for Time Series Analysis. ***Prerequisite: STAT 354*** *Note: Students may receive credit for only one of ACSC 418 or STAT 418*

ACSC 419 - Estimation and Selection of Actuarial Models
This course continues topics relating to loss models covered in ACSC 318, and includes estimating the parameters for severity, frequency, and aggregate distributions using Maximum Likelihood Estimation as well as Bayesian estimation. The topic of model selection is also considered. ***Prerequisite: ACSC 318 and STAT 351***

ACSC 456 - Applied Stochastic Processes
An introduction to stochastic processes; Markov chains; Poisson processes; renewal processes; Brownian motion; simulation. ***Prerequisite: STAT 351.*** *Note: Credit can be earned for only one of ACSC 456, STAT 456, or STAT 856.*

2. MATHEMATICS COURSE DESCRIPTIONS

MATH 051 - Mathematics Co-op Work Term
Four-month co-op work term approved by the department and arranged by the co-op coordinator.

MATH 052 - Mathematics Co-op Work Term
Four-month co-op work term #2 approved by the department and arranged by the co-op coordinator. *** Prerequisite: MATH 051 ***

MATH 053 - Mathematics Co-op Work Term
Four-month co-op work term #3 approved by the department and arranged by the co-op coordinator. *** Prerequisite: MATH 052 ***

MATH 054 - Mathematics Co-op Work Term
Four-month co-op work term #4 approved by the department and arranged by the coop coordinator. *** Prerequisite: MATH 053 ***

MATH 101 - Introductory Finite Mathematics I
This is an introductory course intended to familiarize the students with the basic concepts of arithmetic, number theory, set theory, symbolic logic, and finite mathematics. Topics include logic, sets, numeration systems, arithmetic in non-decimal systems, system of integers, elementary number theory and modular arithmetic. There will be a strong emphasis on critical thinking, problem solving, understanding concepts and their applications. ***Prerequisite: University Admission. *** *Note: Students who have received credit for any mathematics or statistics course (other than MATH 108) cannot take this class for credit, unless it is explicitly required in their program or they have received consent from the Head of the Department of Mathematics and Statistics.*

MATH 102 - Mathematical Modelling and Precalculus
A course in problem solving through the use of mathematical models involving algebraic, exponential, logarithmic, and trigonometric functions and their graphs. The purpose of this course is to enhance students' abilities to express, visualize, and model real-world problems through an understanding of common functions and their graphs. ***Prerequisite: Any one of the following: Foundations of Mathematics 30, Precalculus 20, Math B30, Math C30, or AMTH 092*** *Note: Students who have received credit in Math 103 or 110 cannot take Math 102 for credit*

MATH 103 - Applied Calculus I
Differentiation of algebraic, exponential, and logarithmic functions. Optimization, curve sketching, and integration by substitution. ***Prerequisite: Precalculus 30 or Mathematics B30 with a grade of at least 65%, or PMTH 092 with a grade of at least 70%, or Math102*** *Note: Although Math 103 leads to Math 112, students who require three or more calculus-based courses should take Math 110 instead of Math 103. Students will only receive credit for one of MATH 103 or 110*

MATH 108 - Mathematical Problems, Ideas and Personalities
This course explores some of the most significant and enduring ideas in mathematics: the great theorems, discoveries of beauty and insight that stand today as monuments to the human intellect. *** Prerequisite: Precalculus 20 or Foundations of Math 20 or Math A30 or AMTH 092*** * Note: This course is designed mainly for students in arts or education who wish some exposure to mathematical ideas. It satisfies the critical thinking requirement in the Faculty of Arts.

MATH 110 - Calculus I
An introductory class in the theory and techniques of differentiation and integration of algebraic and trigonometric functions. Topics include limits, optimization, curve sketching, and areas. ***Prerequisite: Precalculus 30 with at least 75%, or Calculus 30 or Mathematics B30 and C30 with a grade of at least 65% in each or Math 102*** *Note: Students can receive credit for only one of MATH 103 or 110*

MATH 111 - Calculus II
Differentiation and integration of exponential and logarithmic functions; methods of integration and applications; indeterminate forms, L'Hospital's rule and improper integrals; sequences, series, power series and Taylor series. ***Prerequisite: MATH 110, or MATH 103 with a grade of at least 80%***

MATH 112 - Applied Calculus II
An introduction to calculus in two and three variables, first-order differential equations, infinite series, and calculus of trigonometric functions. ***Prerequisites: MATH 103 and Precalculus 30, or MATH 110*** *Note: MATH 112 is a terminal course and is not intended for students who require further calculus courses. Students will receive credit for only one of MATH 111 and 112*

MATH 116 - Mathematics of Finance I
his course provides a basis of financial mathematics. Topics include measurement of interest, basic and general annuities, yield rates, amortization schedules, and sinking funds. ***Prerequisite: MATH 103 or 110.*** *Note: Students can receive credit for only one of MATH 116 and ACSC 116*

MATH 122 - Linear Algebra I
A course intended to introduce students to elementary linear algebra, particularly at a computational and applied level. Topics include matrices and systems of equations, inversion, determinants, vectors, inner products, eigenvectors and eigenvalues. *** Prerequisite: Precalculus 30, Mathematics B30 and C30, or Math 102.***

MATH 124 - The Art and Science of Secret Writing
The course examines methods of message encryption and cryptoanalysis. Attention will be given to the history of cryptology and the public-policy questions raised by its use in conjunction with the Internet. However, the focus will be on the mathematical tools needed to develop and analyze encryption algorithms. *** Prerequisites: Foundations of Math 30 or Precalculus 20 or Math B30 or AMTH 092 ***

MATH 127 - Introductory Finite Mathematics II
Elementary linear programming, counting methods involving permutations and combinations, probability, statistics, regression, and consumer mathematics including interest calculations, annuities and amortizations. ***Prerequisite: Foundations of Math 20 or Precalculus 20 or Math B30 or AMTH 092 or MATH 101*** *Note: Mathematics 127 is not algebra, nor pre-calculus, nor calculus. It satisfies the critical thinking requirement in the Faculty of Arts.* *Note: Students outside of the Faculty of Education cannot take this course for credit if they have received credit for a MATH, STAT, or ACSC course above 200.*

MATH 184 - Problem Solving Techniques
A course on hands-on training in mathematical problem solving, with a view towards the Putnam Competition. The course covers strategies to tackle problems, as well as selected topics from algebra, combinatorics, number theory, geometry, and analysis. ***Prerequisite: Precalculus 30 with at least a 75%; or Calculus 30; or Mathematics B30 and C30 with a grade of at least 65% in each; or MATH 102.*** *Note: This course carries only one credit hour.*

MATH 213 - Vector Calculus
A study of vector functions and functions of several variables and their derivatives; Applied maximum and minimum problems, Lagrange multipliers, multiple integration, integration in polar, cylindrical and spherical coordinates; Green's, Stokes' and the Divergence Theorem.
Prerequisite: MATH 111 and 122

MATH 216 - Mathematics of Finance II
This course is a continuation of Mathematics of Finance I and covers more advanced topics ranging from the theory of interest to principles of corporate finance. Specific topics include bonds, securities, analysis of risk and basic principles of pricing theory. ***Prerequisite: MATH 116 or ACSC 116*** *Note: Students can receive credit for only one of Math 216 and ACSC 216*

MATH 217 - Differential Equations I
Ordinary differential equations, modelling with differential equations, Laplace transforms. ***Prerequisite: MATH 111 and MATH 122***

MATH 221 - Introduction to Proofs and Problem Solving
An introductory course intended to familiarize students with mathematical reasoning and proof techniques, including direct reasoning, indirect reasoning, and mathematical induction. Topics include elementary number theory, logic, sets, functions, and relations. ***Prerequisite: Two university math courses beyond MATH 102.***

MATH 222 - Linear Algebra II
A second course in linear algebra. There will be some emphasis on proofs. Topics include matrices, abstract vector spaces, subspaces, bases, inner product spaces, linear transformations, matrix factorizations, symmetric matrices, quadratic forms, and applications of linear algebra. ***Prerequisite: MATH 122, and one of MATH 103 or 110.***

MATH 223 - Introduction to Abstract Algebra
An introductory course in abstract algebra. Topics include number systems and an introduction to groups, and some other mathematical structures. ***Prerequisite: MATH 221.***

MATH 231 - Euclidean Geometry
This course is intended to familiarize the student with Euclidean geometry. Topics include the postulates and theorems of both classical and modern Euclidean geometry. ***Prerequisite: MATH 221*** *Note: This course is designed for students without a strong background in Euclidean geometry. Students with a mark of at least 70% in either Mathematics C30 or Precalculus 30 should register in MATH 331*

MATH 251 - Introduction to Probability
Basic notions of probability; discrete and continuous random variables; expectation; moment generating functions; joint discrete random variables. ***Prerequisites: MATH 111 or MATH 112 and one of STAT 160 or STAT 200*** *Note: Students can receive credit for only one of Math 251 and Stat 251*

MATH 261 - Methods of Numerical Analysis
Topics will include number systems and errors, solutions of polynomial and other nonlinear equations, interpolation, numerical differentiation and integration, and the cubic spline. ***Prerequisite: MATH 111, MATH 122, and CS 110.*** *Note: Students will receive credit for only one of CS 261, CS 345 or MATH 261.*

MATH 284 - Problem Solving Techniques
A course on hands-on training in mathematical problem solving, with a view towards the Putnam

Competition. The course covers strategies to tackle problems, as well as selected topics from algebra, combinatorics, number theory, geometry, and analysis. ***Prerequisite: MATH 184 or permission of the instructor.*** *Note: This course carries only one credit hour.*

MATH 300 - Introduction to Set Theory
Sets, relations, and operations on them. Natural numbers. Finite and infinite sets, ordinals and cardinals. Recursion theorems. Arithmetic of cardinals and ordinals. A brief introduction to set-theoretic topology. Construction of the real numbers and basic properties. ***Prerequisite: MATH 221.***

MATH 301 - Introduction to Mathematical Logic
Propositional and first-order predicate logic from a mathematical viewpoint. Axiomatically built theories and their models. Detailed study of one or more simple mathematical theories. Recursive functions. Basic ideas of automated theorem proving. ***Prerequisite: MATH 221.***

MATH 305 - Introductory Mathematical Analysis
Cardinality, real numbers and their topology, sequences, limits, continuity, and differentiation for functions of one real variable. ***Prerequisite: MATH 221 and 111.*** *Note: This course is designed for students interested in majoring in Mathematics. Students considering a degree in Mathematics with Honours are encouraged to complete this course by the end of their second year.*

MATH 308 - Topics in the History of Mathematics
A survey of the history of mathematics, focusing on mathematics developed before 1850. Topics may include mathematics of ancient cultures, cultural aspects of mathematics, how mathematics developed around the world, famous mathematicians and classical mathematics texts. This course is designed for majors in mathematics or mathematics education with a solid background in mathematics. It will be offered in the winter semester, alternating with MATH 309. ***Prerequisite: MATH 111, 122, and 221.***

MATH 309 - Topics in Modern Mathematics
A survey of modern mathematics, examining the objectives of mathematical advancement, important modern results in mathematics, mathematicians of the modern era, and the influences of modern mathematics on contemporary science. The focus of this course will be on mathematics after Gauss (post 1850). The emphasis will be on general modern approaches to mathematical problems and the philosophy of mathematics, rather than specific results. Topics will include (but are not limited to): the nature of mathematical knowledge, origins of modern mathematics, biographies of mathematicians and the influence of mathematics on contemporary science. ***Prerequisite: MATH 111, 122 and 221.*** *Note: This course is designed for majors in mathematics or mathematics education with a solid background in mathematics. It will be offered in the winter semester, alternating with MATH 308.*

MATH 312 - Complex Analysis I
Complex numbers, analytic functions, contour integration, Cauchy's theorem, infinite series, calculus of residues, basic theory of conformal mappings. ***Prerequisite: MATH 213.***

MATH 313 - Mathematical Analysis II
The Riemann integral for functions of one variable, sequences and series of functions, differentiation and integration for functions of several variables. ***Prerequisites: MATH 213 and MATH 305.***

MATH 316 - Mathematics of Finance III
This course covers the theory and pricing of financial derivatives such as Puts and Calls, with particular emphasis on the Black-Scholes model. ***Prerequisite: ACSC 216 or MATH 216, and STAT 251*** *Note: Students can receive credit for only one of MATH 316, STAT 316, and ACSC 316.*

MATH 317 - Real Analysis
Construction of the real numbers, structure of metric spaces, continuous functions on metric spaces, convergence of series, differential equations. ***Prerequisite: MATH 217 and 313.***

MATH 321 - Number Theory I
This is an introductory course in number theory. Topics include divisibility, primes, congruences, number theoretic functions, and diophantine equations. ***Prerequisite: MATH 221***

MATH 322 - Matrix Theory
Topics include: positive definiteness, Jordan canonical form, nonnegative matrices, and applications in matrix analysis. ***Prerequisite: MATH 222.***

MATH 323 - Modern Algebra I
A course in abstract algebra dealing with groups, rings, unique factorization domains and fields. ***Prerequisite: MATH 223.***

MATH 327 - Introductory Combinatorics
A first course in Combinatorics. Topics include counting, permutations and combinations, inclusion and exclusion, binomial theorem and identities with binomial coefficients, generating functions and recurrence relations, and a brief introduction to design theory. ***Prerequisite: MATH 221 and 111.***

MATH 328 - Introduction to Graph Theory
A first course in Graph Theory. Topics include isomorphism, Graph Algorithms, Trees, Digraphs and Networks, Planar graphs, Connectivity, Independence number, cliques and graph colouring. ***Prerequisite: MATH 221 and 111.***

MATH 329 - Linear and Discrete Optimization
A course in the theory and techniques of linear programming; convexity and extreme points of polyhedral sets, the simplex method, duality and selected applications will be covered. ***Prerequisite: CS 110, MATH 122 and MATH 221 or permission of Department Head.***

MATH 331 - Non-Euclidean Geometry
This course gives an explaination of the nature and foundations of geometry and uses for this purpose the systems of non-Euclidean geometry. It outlines the concept of mathematical models and the historical and logical significance of the parallel postulate. ***Prerequisite: MATH 110, and

one of MATH 122 or MATH 231.*** *Note: Students may receive credit for only one of Math 232 and Math 331.*

MATH 335 - Introduction to Differential Geometry
Differential invariants of curves and surfaces in Euclidean three-space. ***Prerequisite: MATH 217.***

MATH 361 - Numerical Analysis I
Least squares and other approximations. Difference equations. Solutions of algebraic systems. Symbol manipulators. ***Prerequisite: MATH 213 and either MATH 261 or CS 261.***

MATH 381 - Differential Equations II
Series solutions of linear equations, systems of linear first-order equations, Fourier series, boundary-value problems, integral transforms, and numerical methods. ***Prerequisite: MATH 217.***

MATH 382 - Ordinary Differential Equations
Existence and uniqueness of solutions, linear systems, non-linear equations, stability, Liapunov's method, applications. ***Prerequisite: MATH 217.***

MATH 384 - Problem Solving Techniques
A course on hands-on training in mathematical problem solving, with a view towards the Putnam Competition. The course covers strategies to tackle problems, as well as selected topics from algebra, combinatorics, number theory, geometry, and analysis. ***Prerequisite: MATH 284 or permission of the instructor.*** *Note: This course carries only one credit hour.*

MATH 395AB - Directed Readings in Probability Theory
Selected advanced topics concerning multivariate random variables and distributions, and stochastic processes. ***Permission of the Department Head is required to register***

MATH 401 - Matrix Groups
An introduction to Lie group theory through study of the classical groups. *** Prerequisite: MATH 305 and 323 ***

MATH 411 - Measure and Integration
Measurable functions, Lebesgue integrals, Lp spaces, modes of convergence, signed measures, Radon-Nikodym Theorem. ***Prerequisite: MATH 313.***

MATH 412 - Complex Analysis II
This is a continuation of MATH 312. Topics include conformal mappings, argument principle, Rouche's theorem, harmonic functions, Riemann Mapping Theorem, infinite products, asymptotic expansions. ***Prerequisite: MATH 312.***

MATH 416 - Introduction to Quantum Information Theory
A first course in the mathematics of quantum information theory. Topics include information measures, quantum states and observables, qubits, entanglement, quantum channels, entropy, and

measurements. ***Prerequisite: MATH 305 or MATH 312 or MATH 322, or permission of the Department Head***

MATH 418 - Introduction to Lie Algebras and Representation Theory
This course is an introduction to the structure of finite dimensional complex semisimple Lie algebras, via root systems, as well as their finite dimensional irreducible representations, through highest weight modules. ***Prerequisites: MATH 222 and 323*** *Note: Students can only receive credit for one of MATH 418, 495AD, and MATH 818.*

MATH 420 - Introduction To Commutative Algebra
A first course in commutative algebra. Topics include prime and maximal ideal, radicals, Nakayama's Lemma, exact sequences, tensor products, localization, Noetherian and Artinian rings. Additional topics may vary. This class is designed for advanced students in disciplines such as Mathematics and Computer Science who want to learn some commutative algebra. ***Prerequisite: MATH 222 and MATH 323***

MATH 421 - Number Theory II
This course is a second course in number theory. Topics include quadratic reciprocity, arithmetic functions, distribution of primes, and the prime number theorem. ***Prerequisite: MATH 321, 305, and 312.***

MATH 422 - Abstract Linear Algebra
A course which presents linear algebra in a theoretical setting. Topics include vector spaces, dual spaces, linear transformations, Jordan canonical form, the spectral theorem, and selected topics. ***Prerequisite: MATH 222 and MATH 323. ***

MATH 423 - Modern Algebra II
Continuation of Modern Algebra I with further study of rings, groups and fields. ***Prerequisite: MATH 323.***

MATH 424 - Applied Algebra
This is a course in applications of algebra to a selection of topics concerning enumeration, coding, finite state machines and cryptography. ***Prerequisite: MATH 223.***

MATH 425 - Matrix Analysis
A survey of some of the important topics from Matrix Theory with emphasis on matrix canonical forms, norms, spectral theory, perturbation theory of matrices, and special classes of matrices ***Prerequisite: MATH 305, MATH 322, and MATH 323.***

MATH 426 - Combinatorial Matrix Theory
A survey of some of the topics from combinatorial matrix theory including: spectral graph theory and algebraic graph theory. ***Prerequisite MATH 222 and 328.***

MATH 427 - Graph Theory
This course is a survey of topics in graph theory. Topics may include the following: matchings and factorizations, connectivity, colouring, isomorphisms, homomorphisms, automorphism groups and

transitive graphs, extremal problems, adjacency matrices, spectral graph theory, strongly regular graphs, Cayley graphs, Ramsey theory and random graphs ***Prerequisite: MATH 223 and 328.***

MATH 431 - Differential Geometry I
Differentiable manifolds, the tangent bundle, differential forms, and the general Stokes' theorem. ***Prerequisite: MATH 313 or MATH 335.***

MATH 438 - Associative Algebras, Groups, and Representation Theory
An introductory course on the fundamental results concerning associative algebras, groups, and the representation theory of groups and algebras. ***Prerequisite: MATH 222 and MATH 323***

MATH 441 - General Topology
An introduction to point set topology including separation axioms, compactness, connectedness, continuous functions and metric spaces. ***Prerequisite: MATH 305.***

MATH 442 - Algebraic Topology
A first course in algebraic topology. Topics include, homotopy type, more detailed information on the fundamental group, and the homology and cohomology of topological spaces. ***Prerequisite MATH 441, or approval of the department chair.***

MATH 443 - Homological Algebra
A first course in homological algebra. Topics include modules over rings, chain complexes, homology, projective and injective resolutions, derived functors, abelian categories, derived categories, and selected additional topics ***Prerequisite: MATH 222 and MATH 323.*** *Note: Students may receive credit for one of MATH 443 or MATH 843.*

MATH 461 - Numerical Analysis II
Numerical solutions of ordinary differential equations; numerical solutions of partial differential equations; linear and non-linear problems. ***Prerequisite: MATH 361 or CS 361.***

MATH 481 - Partial Differential Equations
Classification and basic properties of equations, separation of variables, Fourier series, Sturm-Liouville theory, Fourier and Laplace transforms. ***Prerequisite: MATH 381.***

MATH 482 - Laplace Transforms
Properties of the Laplace Transform. Convolutions. The inversion integral. Applications to solutions of differential equations. *** Prerequisite: MATH 217 and 312.***

MATH 485 - Introduction to Functional Analysis
Metric, normed linear and inner-product spaces, linear operators and fixed point theorems. Spectral decompositions the Stone-Weierstrass theorem, applications. ***Prerequisite: MATH 312 and 313.***

MATH 495AB - Topology II
Topology II consists of Tietze extension theorem, Urysohn metrization theorem, tychonoff theorem, compact metric spaces.

MATH 495AC - Introduction to Continuum Mechanics
his course is an introduction to the physical concepts and mathematical methods of continuum mechanics with the aim of preparing the student for further studies and research in fluid dynamics. ***Prerequisite: MATH 381***

MATH 495AE - Introduction to von Neumann algebras
In this course we introduce von Neumann algebras and we emphasize connections with ergodic&group theory. We present constructions of von Neumann algebras from groups&actions; explain how group theoretical aspects (e.g. amenability) and orbit equivalence are connected to von Neumann algebras. We assume no background except basic knowledge of real analysis.

MATH 497 - Honours Seminar I
This is the first of two honours seminars. This course must be taken by all honours students in their fourth year. Students are required to attend the seminars and to work in consultation with an assigned supervisor on an independent research project. To receive credit for MATH 497, students must present a seminar on their preliminary work. *Note: This seminar is restricted to honours standing students in mathematics.*

MATH 498 - Honours Seminar II
This is the second of two honours seminars. This course must be taken by all honours students in their fourth year. Students are required to attend the seminars and to work in consultation with an assigned supervisor on an independent research project. To receive credit for MATH 498, students must present their project in both written form and as a seminar. *Note: This seminar is restricted to honours standing students in mathematics.*

3. Statistics Course Descriptions

STAT 051 - Statistics Co-op Work Term #1
Four-month co-op work term #1 approved by the department and arranged by the co-op coordinator.

STAT 052 - Statistics Co-op Work Term #2
Four-month co-op work term #2 approved by the department and arranged by the co-op coordinator. *** Prerequisite: STAT 051 ***

STAT 053 - Statistics Co-op Work Term #3
Four-month co-op work term #3 approved by the department and arranged by the co-op coordinator. *** Prerequisite: STAT 052 ***

STAT 054 - Statistics Co-op Work Term #4
Four-month co-op work term #4 approved by the department and arranged by the co-op coordinator. *** Prerequisite: STAT 053 ***

STAT 100 - Elementary Statistics for Applications
An introduction to statistical methods; descriptive statistics; the normal distribution; basic techniques of statistical inference; confidence intervals and hypothesis tests for population means and proportions; simple linear regression; and one-way analysis of variance. ***Prerequisite:

Foundations of Math 20 or Precalculus 20 or Apprenticeship & Workplace Math 30 or MATH A30 or AMTH 091 or MATH 101*** *Note: STAT 100 and STAT 200 are designed to provide a year-long introduction to statistical methodology with a view towards applications and are not intended for majors in statistics, actuarial science, or any other program requiring a detailed knowledge of statistics. Students who receive credit for STAT 100 may not receive credit for STAT 160*

STAT 160 - Introductory Statistics
A comprehensive introduction to probability, probability distributions, sampling distributions, basic techniques of statistical inference, analysis of variance, linear regression, inference for categorical variables, and nonparametric statistics. ***Prerequisite: Precalculus 30, or MATH B30 and MATH C30, or MATH 127*** *Note: STAT 160 is designed to provide a comprehensive single semester introduction to statistical techniques and is intended for students majoring in statistics, actuarial science, or any other program requiring a detailed knowledge of statistics. Students who receive credit for STAT 160 may not receive credit for STAT 100 or STAT 200*

STAT 165 - Introduction to Programming with Python
An introduction to problem-solving techniques using Python. This course will introduce fundamental programming principles and topics: data types, expressions, control structures, elementary data structures, functions, files, and the mechanics of running, testing and debugging. These concepts will be applied to problem solving and applications in data analysis. ***Prerequisite: Foundations of Mathematics 30, Precalculus 20, Math B30, Math C30, or PMTH 092.*** *Note: Students may receive credit for one of CS 165 or STAT 165.*

STAT 200 - Intermediate Statistics for Applications
A continuation of STAT 100; inference for two categorical variables; basic multiple linear regression; two-way analysis of variance; introduction to nonparametric methods; statistical process control; introduction to survey design. ***Prerequisite: STAT 100*** *Note: STAT 100 and STAT 200 are designed to provide a year-long introduction to statistical methodology with a view towards applications and are not intended for majors in statistics, actuarial science, or any other program requiring a detailed knowledge of statistics. Students who receive credit for STAT 200 may not receive credit for STAT 160*

STAT 217 - Introduction to Actuarial Mathematics
Topics include: economics of insurance, applications of probability to problems of life insurance, life annuities, and life tables. ***Prerequiste: ACSC 116 or MATH 116, and STAT 251*** *Note: Students may receive credit for only one of ACSC 217 or STAT 217*

STAT 251 - Introduction to Probability
Basic notions of probability; discrete and continuous random variables; expectation; moment generating functions; joint discrete random variables. ***Prerequisites: MATH 111 or MATH 112 and one of STAT 160 or STAT 200*** *Note: Students can receive credit for only one of Math 251 and Stat 251*

STAT 252 - Introduction to Statistical Inference
Sampling distribution theory and the Central Limit Theorem; large sample theory; methods of estimation and hypothesis testing including maximum likelihood estimation, likelihood ratio testing, and confidence interval construction. ***Prerequisite: STAT 251.***

STAT 289 - Statistics for Engineers
Topics include probability, discrete and continuous distributions, the central limit theorem, confidence intervals and hypothesis tests for one and two samples, linear regression and correlation. ***Prerequisite: MATH 111*** *Note: Designed for engineering students. Students who received credit for STAT 289 may not receive credit for STAT 100, 160, or 200.

STAT 300 - Statistical Learning and Predictive Modeling
Selected topics and techniques in statistical learning and predictive modeling, including linear models, logistic regression models, regression trees, classification models and statistical software. ***Prerequisite: MATH 122, STAT 252, and CS 110*** *Note: Students can receive credit for only one of ACSC 300 and STAT 300*

STAT 301 - Introduction to Statistical Computing
This course aims to provide students with an introduction to statistical computing. Topics include the basics of programing for statistics, data visualization, simulation of random variables, numerical optimization, statistical inference, and selected additional topics. ***Prerequisite: MATH 122, STAT 252, and CS 265.***

STAT 316 - Mathematics of Finance III
This course covers the theory and pricing of financial derivates such as Puts and Calls, with particular emphasis on the Black-Scholes model. ***Prerequisite: ACSC 216 or MATH 216, and STAT 251*** *Note: Students can receive credit for only one of MATH 316, STAT 316 and ACSC 316*

STAT 317 - Actuarial Models I
Probabilistic and deterministic contingency mathematics in life insurance and pensions. Topics include: benefit premiums, benefit reserves, multiple life functions, and multiple decrement models. ***Prerequisite: ACSC 217 or STAT 217*** *Note: Students may receive credit for only one of ACSC 317 or STAT 317*

STAT 318 - Actuarial Models II
This course introduces collective risk models over an extended period. Stochastic processes are introduced, followed by definition and application of Markov chains. Introductory loss model material is also presented. ***Prerequisite: ACSC 317 or STAT 317*** *Note: Students may receive credit for only one of ACSC 318 or STAT 318*

STAT 342 - Biostatistics
This course will present relevant, up-to-date coverage of research methodology using careful explanations of basic statistics and how they are used to address practical problems that arise in the medial and public health settings. Through this course, students will learn to interpret and examine data by applying common statistical tools to the biostatistical, medical, and public health fields. ***Prerequisite: STAT 160 or STAT 200.*** *Note: Students with credit in BIOL 341 cannot take STAT 342 for credit.*

STAT 351 - Intermediate Probability
Multivariate random variables; conditioning; order statistics; the multivariate normal distribution; the Poisson process. ***Prerequisite: MATH 213 and STAT 251.***

STAT 354 - Linear Statistical Methods
Simple linear regression; multiple linear regression; diagnostics and remedial measures for regression models; remedial measures and alternative regression techniques; multicollinearity diagnostics. ***Prerequisite: STAT 252 and CS 110 and MATH 122.***

STAT 357 - Sampling Theory
Simple random sampling; systematic sampling; stratified and cluster sampling; ratio and regression estimators. ***Prerequisite: STAT 252 and CS 110.***

STAT 362 - Bayesian Statistics
An introduction to Bayesian methods; Bayesian inference for discrete random variables, binomial proportions, and normal means; comparisons between Bayesian and frequentist inferences; robust Bayesian methods. ***Prerequisite: STAT 252 and CS 110.***

STAT 384 - Categorical Data Analysis
Odds ratio; two-way and higher-way contingency tables; Chi-squared tests of independence; loglinear and logit models; multinomial response models; models for matched pairs. ***Prerequisite: STAT 252 and CS 110.*** *Note: It is suggested that students register for STAT 354 concurrently if possible.*

STAT 386 - Nonparametric Statistical Methods
Nonparametric statistics for data analysis including rank-based methods, bootstrap methods, and permutation tests; one-sample and two-sample methods; paired comparisons and blocked designs; tests for trends and association; smoothing methods and robust model fitting. ***Prerequisite: STAT 252 and CS 110.***

STAT 418 - Time Series Analysis and Forecasting
This course aims to introduce various statistical models for time series and cover the main methods for analysis and forecasting. Topics include: Deterministic time series: Trends and Seasonality; Random walk models; Stationary time series: White noise processes, Autoregressive (AR), Moving Average (MA), Autoregressive Moving Average (ARMA) models; Estimation, Diagnosis and Forecasting with various time series models; computer programming for Time Series Analysis. ***Prerequisite: STAT 354*** *Note: Students may receive credit for only one of ACSC 418 or STAT 418*

STAT 426 - Survival Analysis
Life tables; survival distributions; types of censoring; estimation of and interface for basic survival quantities; proportional hazards regression model; planning and design of clinical trials. ***Prerequisite: STAT 351.***

STAT 441 - Stochastic Calculus with Applications to Finance
Processes derived from Brownian motion; the Itô integral and Itô's formula; applications of Itô's formula in financial modelling, especially within the context of the Black-Scholes option pricing model. ***Prerequisite: STAT 351.***

STAT 451 - Advanced Probability
Probability measures; distribution functions; sequences of random variables; characteristic

functions; modes of convergence; convergence theorems; weak and strong laws of large numbers; Central Limit Theorem. ***Prerequisite: STAT 351.***

STAT 452 - Advanced Statstical Inference
Detailed theoretical development of statistical inference; statistical models; exponential families; sufficiency; completeness; properties of point estimation; testing hypotheses and confidence regions; asymptotic properties of estimators. ***Prerequisite: STAT 351 and STAT 252.***

STAT 454 - Applied Multivariate Analysis
Review of multivariate normal distribution; inferences about a mean vector; multivariate linear regression analysis; principal components; factor analysis; canonical correlation analysis. ***Prerequisite: STAT 351 and STAT 354.***

STAT 456 - Applied Stochastic Processes
An introduction to stochastic processes; Markov chains; Poisson processes; renewal processes; Brownian motion; simulation. ***Prerequisite: STAT 351.*** *Note: Credit can be earned for only one of STAT 456, ACSC 456, or STAT 856.*

STAT 470 - Bootstrap Methods
A first course in Bootstrap techniques. Topics include bootstrap and jackknife procedures, confidence intervals, hypothesis testing, standard errors, regression models. Additional topics may vary. ***Prerequisite: STAT 351 and STAT 354*** *Note: Credit cannot be received for both STAT 470 and STAT 870*

STAT 472 - Large Sample Methods
Asymptotic behavior of estimators and test statistics, asymptotic relative efficiency, large sample theory for regression models. ***Prerequisite: STAT 351.*** *Note: Students may receive credit for one of STAT 472 or STAT 495AE.*

STAT 485 - Design and Analysis of Experiments
Theory and application of analysis of variance for standard experimental designs including blocked, nested, factorial, Latin square, and split-plot designs; fixed and random effects; multiple comparisons; analysis of covariance. ***Prerequisite: STAT 354***

STAT 489 - Statistical Consulting and Communications
This course aims to provide students with an understanding of the nature of applied statistical consulting and skills for communicating technical statistical contents with non-statisticians. Topics include the general principles for solving statistical problems, oral and written communication skills, ethics, and collaborative project. ***Prerequisite: STAT 301 and STAT 354.***

STAT 495AC - Readings in Mathematical Finance
This course presents a selection of readings in the theory of mathematical finance, as chosen by the instructor. *** Prerequisite: STAT 351 with a minimum grade of 80% ***

STAT 495AD - Topics in Probability Theory
In depth study of selected topics in probability theory. ***Prerequisite: STAT 451 ***

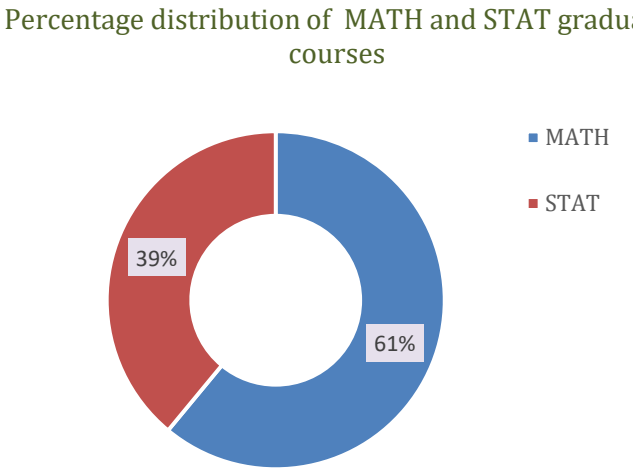
STAT 496 - Data Science Capstone
This is a capstone course for data science majors. This course aims to enhance students' competencies by applying data scientific methodologies to the challenges imposed by real data and skills to effectively communicate project requirements and findings. This course also covers ethical issues and responsible practices in data science. ***Prerequisite: STAT 300, STAT 301, STAT 354, CS 280, and one of CS 412 or CS 465.***

STAT 497 - Honours Seminar
This is the first of two honours seminars. This course must be taken by all honours students in their fourth year. Students are required to attend the seminars and to work in consultation with an assigned supervisor on an independent research project. To receive credit for STAT 497, students must present a seminar on their preliminary work. *Note: This seminar is restricted to honours standing students in statistics.*

STAT 498 - Honours Seminar
This is the second of two honours seminars. This course must be taken by all honours students in their fourth year. Students are required to attend the seminars and to work in consultation with an assigned supervisor on an independent research project. To receive credit for STAT 498, students must present their project in both written form and as a seminar. *Note: This seminar is restricted to honours standing students in statistics.*

APPENDIX III – GRADUATE COURSE DESCRIPTION

The Department of Mathematics and Statistics offers a total of 77 graduate courses, of which 47 are in Mathematics (MATH courses) and 30 are in Statistics (STAT courses).



1. MATHEMATICS COURSE DESCRIPTIONS

MATH 800 - Comprehensive Review of a Selected Topic in Mathematics
The student will conduct an in-depth literature review of a selected area in Mathematics and prepare a report pertaining to the selected topic. The topic will be chosen in consultation with the supervisor and the Department Head. A final examinaton (written, oral or both) will be conducted by a committe of the Department.

MATH 802 - Major Essay in Mathematics
Essay on a selected topic for students in the course-based MSc program in Mathematics.

MATH 803 - Approved Summer School
This course is available to full-time Mathematics graduate students in good standing. Students will participate in a summer school offered by an approved institute. The school and credit award must be approved by the Graduate Coordinator for Mathematics and Statistics (or designee).
Prerequisite: Approval of Department Head. *Note: Students may only take MATH 803 once in their program.*

MATH 810 - Measure & Integration
Integration and measure theory, spaces of continuous functions, and Lp spaces.

MATH 812 - Complex Analysis
Riemann mapping theorem, analytic continuation, Riemann surfaces. *** Prerequisite: MATH 412 ***

MATH 813 - Functional Analysis
Banach spaces, Banach algebras, and operator theory.

MATH 814 - Operator Algebras
C*-algebras and von Neumann algebras.

MATH 816 - Introduction to Quantum Information Theory
A first course in the mathematics of quantum information theory. Topics include information measures, quantum states and observables, qubits, entanglement, quantum channels, entropy, and measurements.

MATH 818 - Intro to Lie Algebras and Representation Theory
The course is an introduction to the structure of finite dimensional complex semisimple Lie algebras, via root systems, as well as their finite dimensional irreducible representations, through highest weight modules.

MATH 819 - Topics in Analysis
Advanced study of selected areas of analysis.

MATH 820 - Introduction to Commutative Algebra
A first graduate course in commutative algebra. Topics include prime and maximal ideals, radicals, Nakayama's Lemma, exact sequences, tensor products, localization, Noetherian and Artinian rings and selected additional topics.

MATH 821 - Number Theory
Topics from analytic and algebraic number theory.

MATH 822 - Linear Algebra
Vector spaces, linear transformations and matrices, canonical forms, multilinear algebra.

MATH 823 - Algebra
Advanced study of group theory, Galois theory, and ring and module theory. *** Prerequisite: MATH 423 ***

MATH 824 - Topics in Algebra
Advanced study of selected areas of algebra.

MATH 825 - Matrix Analysis
Matrix canonical forms, norms, spectral theory, perturbation theory, special classes of matrices.

MATH 826 - Combinatorial Matrix Theory
Matrices arising from directed and undirected graphs, and related connections between matrix theory and combinational mathematics.

MATH 827 - Graph Theory
Advanced study of selected areas of graph theory.

MATH 828 - Combinatorics
Advanced study of selected areas of combinatorics.

MATH 831 - Differential Geometry
Differentiable manifolds, the tangent bundle, differential forms, and the general Stokes' theorem.

MATH 832 - Topics in Differential Geometry and Topology
Advanced study of selected areas of differential geometry and topology.

MATH 837 - Intro to Algebraic Number Theory
A course on rings of integers of algebraic number fields, Dedekind rings, and Ideal Class Groups.

MATH 838 - Associative Algebras, Groups, and Representation Theory
An introductory course on the fundamental results concerning associative algebras, groups, and the representation theory of groups and algebras.

MATH 841 - General Topology
Separability of spaces, paracompactness, metrization theorems, function spaces.

MATH 842 - Algebraic Topology
Introduction to homotopy groups, and to the homology and cohomology of topological spaces.

MATH 843 - Homological Algebra
A first graduate course in homological algebra. Topics include modules over rings, chain complexes, homology, projective and injective resolutions, derived functors, abelian categories, derived categories, and selected additional topics.

MATH 849 - Topics in Topology
Advanced study of selected areas of topology.

MATH 869 - Numerical Analysis
Advanced study of selected areas of numerical analysis.

MATH 881 - Partial Differential Equations
The Cauchy problem, the Fredholm alternaive in Banach space, the potential equation, the Dirichlet problem, the heat equation, Green's functions, and the separation of variables.

MATH 882 - Topics in Applied Mathematics
Advanced study of selected topics in applied mathematics.

MATH 890AG - Topics in Combinatorics
This course will include transitivity in graphs, eigenvalues of graphs, homomorphisms of graphs, and some results from extremal set theory, particularly the Erdos-Ko-Rado theorem that can be proven using algebraic graph theory.

MATH 890AH - Topics in Complex Manifold Theory
definition, examples incl. projective spaces, tori, type decompositions as (1, 0), (0, 1), holomorphic

functions, holomorphic forms, sheaves, sheaf cohomology, Dolbeault cohomology, divisors, fiber bundles incl. line bundles and vector bundles, almost complex manifolds, Hermitian metrics, Kaehler metrics, connections

MATH 890AI - Lie Groups
This course is an introduction to the main fundamental results of Lie Group theory through an extensive study of the classical groups.

MATH 890AK - Extremal combinatorics
An introduction to extremal combinatorics and extremal set theory.

MATH 890AL - Permutation Groups
A course in the theory of permutation groups, with an emphasis on actions of finite permutation groups on combinatorial structures, such as graphs, designs and geometries.

MATH 890AM - Topics In Analysis II
Advanced study of selected areas of analysis and operator algebras.

MATH 890AN - Advanced Topics in Functional Analysis
Locally convex topologies, geometry of Banach spaces, bounded and unbounded operators on Banach spaces, spectral theory.

MATH 890AP - Quiver representations of algebras
The algebra of a quiver; Auslander-Reiten quivers; classification of finite dimensional algebras and their representation theory in terms of quivers.

MATH 890AQ - Matrix Analysis and Entrywise Positivity Preservers
This course is an advanced course in matrix analysis and will concentrate on the topic of entrywise positivity preservers. Preservers are functions that operate on the individual entries of matrices and preserve the cone of positive semidefinite matrices.

MATH 890AT - Design Theory
This course will be an introduction to design theory. This course will include block designs, symmetric designs, Hadamard matrices and orthogonal arrays. We also study distance regular graphs, projective and affine space. We will look at focus on constructions and bounds of designs as well as connections to other areas of math.

MATH 890AU - Combinatorial Association Scheme
This class will be on Association Schemes with a combinatorial perspective. The course will look at specific association scheme arising in graph theory, such as distance regular graphs, strongly regular graphs and the Johnson scheme. Including a focus on the symmetric group and how it applies to Schurian association schemes.

MATH 900 - Seminar
Preparation and presentation of a one-hour lecture to graduate students and faculty.

MATH 901 - Research
Thesis research.

MATH 902 - Research Tools in Mathematics
Software tools (Maple, Mathematica, Matlab, GAP, LaTeX) and literature databases (Math Sci Net, Zentralblatt Math, Euler, preprint archives).

MATH 903 - Comprehensive Exam 1
Students must complete a comprehensive exam in one of the following topics: Matrix Theory and Linear Algebra, Commutative Algebra, Abstract Algebra, or Cominatorics and Graph Theory. It is evaluated on a pass/fail basis.

MATH 904 - Comprehensive Exam 2
Students must complete a comprehensive exam in one of the following topics: Topology, Algebraic Topology, Functional Analysis, Measure and Integration, Differential Geometry, or Probability Theory. It is evaluated on a pass/fail basis.

MATH 905 - Research Proposal
Students are required to submit a written research proposal for their PhD thesis research project during its early stages. The candidate will give a seminar before the department to defend their proposal. The topic must be approved by the research supervisor and the candidate's PhD committee. It is evaluated on a pass/fail basis. This course is required of all PhD students in Mathematics, and will usually be completed following the completion of MATH 903 and 904.

2. STATISTICS COURSE DESCRIPTIONS

STAT 800 - Comprehensive Review
The student will conduct an in-depth literature review of a selected area in Statistics and prepare a report pertaining to the selected topic. The topic will be chosen in consultation with the supervisor and the Department Head. A final examination (written, oral or both) will be conducted by a committee in the Department.

STAT 802 - Major Essay in Statistics
Essay on a selected topic for students in the course-based MSc program in Statistics.

STAT 803 - Approved Summer School
This course is available to full-time Statistics graduate students in good standing. Students will participate in a summer school offered by an approved institute. The school and credit award must be approved by the Graduate Coordinator for Mathematics and Statistics (or designee).
Prerequisite: Approval of Department Head. *Note: Students may only take STAT 803 once in their program.*

STAT 818 - Time Series Analysis and Forecasting
A first graduate course in time series models and analysis. Topics include deterministic and stochastic models, stationary and non-stationary time series models, state space models, spectral analysis, and selected additional topics.

STAT 826 - Advanced Survival Analysis
Life table, survival distributions, types of censoring, estimation and inference for basic survival quantities, proportional hazards regression model, goodness of fit tests.

STAT 851 - Probability
Probability measures; distribution functions; sequences of random variables; characteristic functions; modes of convergence; convergence theorems; weak and strong laws of large numbers; Central Limit Theorem

STAT 852 - Statistical Inference
Detailed theoretical development of statistical interference; statistical models; exponential families, sufficiency; completeness; properties of point estimation; testing hypothesis and confidence regions; asymptotic properties of estimators.

STAT 853 - Limit Theorems
Probability inequalities, weak limit theorems (central limit theorem, weak law of large numbers), strong limit theorems (strong law of large numbers, law of iterated logarithm).

STAT 855 - Generalized Linear Models
Generalized linear models, exponential family, likelihood-based inference, analysis of contingency tables, estimation procedures.

STAT 856 - Stochastic Processes
A first graduate course in stochastic processes. Topics include Markov chains, Poisson process, renewal theory, Brownian motions and selected additional topics. This class is cross-listed with STAT 456 and ACSC 456.

STAT 858 - Statistical Modeling of Dependence and Extremes
A first graduate course in extreme value theory and copula dependence modelling. Topics include copula models, dependence measures, order statistics, maximum domains of attraction, extreme value distribution, peak over threshold method, generalized Pareto distribution and selected additional topics. ***Prerequisite: STAT 851 or permission of the Department Head.***

STAT 859 - Design of Experiments
Completely randomized designs, randomized block designs, factorial and fractional factorial designs, nested designs, fixed and random effects models.

STAT 862 - Advanced Topics in Stochastic Processes
This is an advanced course in stochastic processes. Topics include: Measure theoretic probability theory, stopping theorems, Poisson process, renewal processes, Markov processes, Brownian motion, Gaussian processes, martingales, stochastic integration, and applications.

STAT 870 - Bootstrap Methods
A first course in Bootstrap techniques. Topics include bootstrap and jackknife procedures, confidence intervals, hypotheses testing, standard errors, regression models. Additional topics may vary. jackknife procedures, confidence intervals, hypotheses testing, standard errors, regression models. Additional topics may vary.

STAT 872 - Large Sample Methods
Asymptotic behavior of estimators and test statistics, asymptotic relative efficiency, large sample theory for regression models.

STAT 890AD - Analysis of Longitudinal Data
Exploring longitudinal data. General linear model for longitudinal data. Parametric model for the convariance structure. Generalized linear model for longitudinal data. Likelihood-based methods for categorical data. Missing values for longitudinal data.

STAT 890AF - Directed Readings in Stochastic Processes
Directed readings in Stochastic Processes as selected by the instructor.

STAT 890AG - Statistical Analysis with Missing Data
Missing data is a major issue in statistical analysis. This course introduces the four common approaches for inference in models with missing values, including maximum likelihood, multiple imputation, fully Bayesian, and weighted estimating equations. Computational tools (e.g. the EM algorithm and the Gibbs' sampler) will be discussed.

STAT 890AI - Multivariate Statistical Modelling
Univariate generalized linear models, models for multicategorical responses, multivariate extensions of generalized linear models, selecting and checking models, semi and nonparametric approaches to regression analysis.

STAT 890AJ - Statistical Analysis for Language Assessment
This course explores statistical methods for language test validity and reliability. The main focus will be on Rasch models.

STAT 890AR - Stochastic Differential Equations for Finance
Modelling of mathematical finances in continuous time, stochastic integrals Itô's formula

STAT 890AS - Advanced Applied Multivariate Statistics in Educational Psychology
The purpose of this course is to teach the application of multivariate analysis to research problems in Educational Psychology. This course will include advanced instruction in applied multivariate analysis, including: simple linear regression, multiple regression, nonlinear regression, time-series analysis, logistic regression, MANOVA, factor analysis, between-groups comparison, profile analysis, structural equation modeling and path analysis. The course is designed to broaden one’s understanding of applied statistics, and designing quantitative studies.

STAT 890AT - Regression Models for Time Series Analysis
Times Series Following Generalized Linear Models: Regression Models for Binary Time Series; Regression Models for Categorical Time Series; Regression for Count Time Series; Other models and Alternative ApproachesSTAT Space Models: Prediction and Interpolation

STAT 890AW - Statistics in the Health Science
Function-Based Inference; Likelihood Tenet; Martingale; Bayes Factor; Empirical Likelihood; Jackknife and Bootstrap.

STAT 900 - Seminar
Preparation and presentation of a one-hour lecture to graduate students and faculty.

STAT 901 - Research
Thesis research

STAT 902 - Research Tools in Statistics
Software tools (SAS, Maple, Mathematica, Matlab, LaTeX) and literature databases (Math Sci Net, STM-Z, preprint archives).

STAT 903 - Comprehensive Exam 1
Students must complete a comprehensive exam in Probability Theory. The exam will also include one of the following elective topics: Stochastic Processes, Dependence and Extremes, Limit Theorems, or Measure and Integration. It is evaluated on a pass/fail basis.

STAT 904 - Comprehensive Exam 2
Students must complete a comprehensive exam in Statistical Inference. The exam will also include one of the following elective topics: Generalized Linear models, Survival Analysis, Experimental Design, Time Series Analysis, Linear Models, or Sampling Theory. It is evaluated on a pass/fail basis.

STAT 905 - Research Proposal
Students are required to submit a written research proposal for their PhD thesis research project during its early stages. The candidate will give a seminar before the department to defend their proposal. The topic must be approved by the research supervisor and the candidate's PhD committee. It is evaluated on a pass/fail basis. This course is required of all PhD students is Statistics, and will usually be completed following the completion of STAT 903 and 904

APPENDIX IV – UNIT BUDGET

Revenue

Fiscal Year	Annual Budget	Misc. Annual Budget	Tuition and Fees	Cost Recoveries	Total Revenue
2021-2022	119,369.96	15,000.00	0	50,119.74	184,489.70
2020-2021	120,615.67	15,000.00	0	0	135,615.67
2019-2020	114,810.19	15,000.00	0	38,242.19	168,052.38
2018-2019	112,778.27	15,000.00	-71.14	30,351.12	158,058.25
2017-2018	110,273.20	15,000.00	0	22,788.53	148,061.73
2016-2017	114,246.66	15,000.00	0	30,889.06	160,135.72
2015-2016	127,312.72	0	0	28,587.60	155,900.32
2014-2015	118,783.00	15,000.00	0	32,249.24	158,408.24
2013-2014	101,007.00	15,000.00	0	33,604.38	149,611.38
2012-2013	100,133.00	26,800.00	0	10,204.47	137,137.47

Expenditures

Fiscal Year	Non-capital expenditures	Capital expenditures	Total expenditures
2021-2022	15,843.92	7,312.09	23,156.01
2020-2021	9,079.91	15,415.86	24,495.77
2019-2020	35,445.30	17,698.21	53,143.51
2018-2019	17,796.78	14,051.14	31,847.92
2017-2018	24,144.30	19,363.14	43,507.44
2016-2017	19,793.91	8,702.70	28,496.61
2015-2016	22,024.38	19,012.41	41,036.79
2014-2015	25,630.63	12,973.36	38,603.99
2013-2014	21,995.95	12,130.58	34,126.53
2012-2013	16,953.40	28,744.94	45,698.34

Salaries*, Benefits* and Awards

Fiscal Year	Academic Salaries (TAs and markers)	Other Salaries	Benefits	Awards and Financial Assistance	Total Salaries, Benefits and Awards
2021-2022	148,010.23	884.21	9,759.96	16,056.65	174,711.05
2020-2021	183,930.64	0	12,262.6	24,846.47	221,039.78
2019-2020	139,155.28	6,210.64	8,146.19	11,334.11	164,846.22
2018-2019	130,734.97	-13,669.99	6,645.27	0	123,710.25
2017-2018	92,557.62	402.51	4,140.20	4,900.08	102,000.41
2016-2017	131,169.42	22,896.28	8,113.66	4,600.00	166,779.36
2015-2016	111,170.07	9,352.16	7,224.72	7,496.44	135,243.39
2014-2015	117,731.22	14,550.08	7,624.00	242.03	140,147.33
2013-2014	88,494.25	2,234.75	0	0	90,729.00
2012-2013	118,194.92	103.07	0	5,625.00	123,922.99

*Does not include faculty member salaries and benefits

Martín Argerami

Professor

argerami@uregina.ca, (306) 585 4340,

Education and Professional Development

- Ph.D. in Mathematics (1998, Universidad Nacional de La Plata, Argentina).
- Licenciado en Matemática (1990, Universidad Nacional de La Plata, Argentina)

Employment History

- Professor (2014–, University of Regina).
- Associate Professor (2007–2014, University of Regina).

Teaching History

- Math 111 (Winter 2017)
- Math 122 (Linear Algebra I; Fall 2010, 2015, 2017, 2020, 2021)
- Math 213 (Calculus IV; Winter2013, 2019; Fall 2011, 2016, 2019)
- Math 217 (Differential Equations and Series; Winter 2018; Fall 2015, 2019, 2020)
- Math 221 (Introduction to Proofs and Problem Solving; Winter 2013)
- Math 300 (Set Theory; Winter 2015)
- Math 322 (Matrix Analysis; Fall 2014, 2016, 2018, 2022)
- Math 381 (Differential Equations II; Fall 2013, 2014)
- Math 411/810 (Measure and Integration; Winter 2012, 2014, 2018, 2020, 2021)
- Math 416/816 (Introduction to Quantum Information; Winter 2022)
- Math 422/822 (Abstract Linear Algebra; Fall 2017, 2019)
- Math 423/823 (Modern Algebra II; Fall 2021)
- Math 813 (Functional Analysis; Fall2012, 2018, 2020, 2022)
- Math 814 (Operator Algebras; Winter 2015)
- Math 819 (Topics in Functional Analysis; Spring 2022)

Student Supervision

Name	Position	Dates of supervision
Amitabh Halder	Ph.D. student	Since Sept 2021

Shane Crerar	M.Sc. student	Since Sept 2020
Saleh Mustafa	Ph.D.	2014-2019
Syed Shah	M.Sc. (not defended)	2012-2014
Maram Albayyadhi	M.Sc.	2010-2012

University Service

Committees related to student supervision

- Member of the Thesis Committee for Mathew Gabriel, Tyler Wood, Lu Di, Brian Ketelboeter, Daniel Krumer, Alaa Alzulaibani, Vijayaparvathy Agasthian, Angshuman Bhattacharya.
- External Examiner for Ms. Fahimeh Bayeh, M.Sc., University of Regina, November 2016.
- Chair for the Thesis Committee for Heather Ritemburg, John Owolagba, Sadra Abedinzadeh, Gongchen Li.

Other Committees

- Member of the Executive of Council, University of Regina,(2012–2014, 2015–2017, 2018–2020, 2021–2023), Department Graduate Committee (2019–),PIMS Postdoctorial Fellowship Selection Committee (2021–2023), Dean of Science Review Committee (2021), Department Research Committee (2019–2021), Campus Promotion Committee,(2018), Department Graduate Committee (2017–2019), Faculty of Science Faculty Review committee (2017), Faculty of Science Lab Instructor Review Committee (as proxy, 2014–2016), Web Manager for the Department of Mathematics and Statistics (2014–2016).

  URFA Grievance Committee (2011–2014), Graduate Coordinator(2010–2014).

Research Service

- Reviewer for Discovery Grants for NSERC, Research Projects for the Croatian Science Foundation, and Agencia Nacional de Promoción Científica y Tecnológica (Argentina).
- Referee for Advances in Mathematics, Journal of Functional Analysis, Contemporary Mathematics Series (American Mathematical Society), Crux Mathematicorum with Mathematical Mayhem, J. Reine Ang. Mathematik, Journal of Mathematical Analysis and Applications, Journal of Operator Theory,Linear Algebra and its Applications, Linear and Multilinear Algebra, Proceedings of the AmericanMathematical Society, Transactions of the American Mathematical Society, Proceedings of the Edimburgh Mathematical Society, Proceedings of the London Mathematical Society, Operators and Matrices,Indiana University Math Journal, Positivity, Canadian Journal of Mathematics, Mediterranean Journal of Mathematics, Operators and Matrices, Banach Journal of Mathematical Analysis,.
- Reviewer for Zentralblatt Math. (129 reviews since 2003) and Mathematical Reviews (42 reviews since 2008).

Scholarly Research

Journal Publications

- M. Argerami, S. Mustafa, “Higher Rank Numerical Ranges of Jordan-Like Matrices”, Linear and Multilinear Algebra, 69 (2021), 5, 807–826.
- M. Argerami; “The Matricial Range of E21”, Expositiones Mathematicae, 37, 1 (2019), 48–83.
- M. Argerami, D. Farenick; “C∗-Envelopes of Jordan Operator Systems”, Operators and Matrices, 9 (2015), 2, 325–341.
- M. Argerami, “Majorisation and the Carpenter’s Theorem”, Integral Equations and Operator Theory, 82 (2015), 1, 33-49.
- M. Argerami, D. Farenick; “The C∗-Envelope of an Irreducible Periodic Weighted Unilateral Shift”, Integral Equations and Operator Theory, 77 (2013), issue 2, 199-210.
- M. Argerami, P. Massey; “Schur-Horn Theorems in II∞ factors”, Pacific Journal of Mathematics, 261 (2013) No. 2, 283-310.
- M. Argerami, D. Farenick, and P. Massey; “Second-Order Local Multiplier Algebras of Continuous Trace C∗-algebras”, Journal of Mathematical Analysis and Applications, 397 (2013), no. 2, 822-836.

Invited Lectures at Conferences

- CMS Summer Meeting (St. John’s,NL, 2022).
- IWOTA (Lancaster, UK, 2021), CMS Summer Meeting (Ottawa, ON, 2021).
- Meeting of the International Linear Algebra Society (Ames, IA, 2017).
- XXI Coloquio Latinoamericano de Algebra (Buenos Aires, Argentina, 2016).
- Alberta Math Dialogue (Calgary, AB, 2016).
- KOTAC 2015 (Daejeon, South Korea, 2015).
- CMS Winter Meeting (Hamilton, ON, 2014).
- Mathematical Congress of the Americas, special session on C∗-algebras, operator spaces, and operator theory (Guanajuato, Mexico, 2013).
- Workshop on Sofic and Hyperlinear Groups and the Connes Embedding Conjecture (UFSC, Florian´opolis, Brazil, June 2013).
- On Harmonic analysis, Operator Algebras and Representations (CIRM, Marseille, France, October 2012).
- Latin American Congress of Mathematicians (Córdoba, Argentina, August 2012).
- 23 IWOTA (New South Wales University (Sydney, Australia, July 2012).
- 40 COSY (Queen’s University, Kingston, ON, May 2012).

Taehan Bae

Associate Professor

taehan.bae@uregina.ca, (306) 585 4353,

Education and Professional Development

Doctor of Philosophy, Statistics
University of Western Ontario (UWO), London, Ontario, Canada, Aug. 2008
Dissertation : "Stochastic Models for Corporate Exit and Credit Rating Migration"
Supervisor: Reg J. Kulperger
Master of Science, Actuarial Science
University of Iowa, Iowa City, Iowa, USA, Dec. 2003
Supervisor: Elias S.W. Shiu
Bachelor of Science, Mathematics
Seoul National University, Seoul, Korea, Feb. 1999

Professional Designations:
ASA: Associate member of Society of Actuaries
ACIA: Associate member of Canadian Institute of Actuaries

Employment History

University of Regina, Associate Professor (tenured), Jul. 2015 – present
University of Regina, Assistant Professor (tenure track), Jul. 2011 – Jun. 2015

Teaching History

ACSC 216 (Winter 2021/2020): Mathematics of Finance II
ACSC 318 (Winter 2022/2014/2013/2012): Actuarial Models II
ACSC 417 (Fall 2022/2021/2020/2019): Introduction to Casualty Insurance and Credibility
ACSC/STAT 418/STAT 818 (F 2018/2016/2014/2013, W/F 2012): Econometric Models & Forecasts
ACSC 419 (W 2018/2017/2016/2015/2014): Estimation and Selection of Actuarial Models
ACSC/STAT 456/STAT 862 (W 2020): Applied Stochastic Processes

STAT 160 (W 2013, F 2020/2017/2016/2015): Introductory Statistics
STAT/MATH 251 (F 2021/2013): Introduction to Probability
STAT 300 (W 2022/2018/2016): Statistical Learning and Predictive Modeling
STAT 858 (W 2022): Statistical Modelling of Dependence and Extremes
STAT 855 (F 2019/2018/2017): Generalized Linear Models
STAT 890AR (Fall 2012, W 2017/2015): Stochastic Differential Equations for Finance
STAT 890AF (S 2021/2015): Readings in Stochastic Processes

Student Supervision

Name	Position	Dates of supervision
Hanson Dela Quarshie	MSc. Thesis	2021 – present
Saeid Hooshyar	Undergraduate	Summer 2022
Huong Vu	Undergraduate	Summer 2022
Maral Mazjini	Ph.D.	2016 – 2020
Jingwen Liu	MSc. Thesis	2019
Xiaohua Liu	MSc. Thesis	2018 - 2019
Jingjiao Chen	MSc. Thesis	2016
Shanoja Naik	Post.doc Research Associate	2014 - 2015
George Teye	MSc. Thesis	2013

University Service

University of Regina:
Executive council (2012 – 2014)
Faculty of Science Lab Instructor Review Committee (2020)
Mathematics and Statistics Committees: Research, Graduate, Data Science Subcommittee

External:
Canadian Institute of Actuaries Academic Relations committee (2012 – 2016)
Canadian Institute of Actuaries Academic Research subcommittee (2016 – 2017)
Society of Actuaries MLC exam (grading) committee (2013 – 2017)
Executive member (Secretary) of Statistical Society of Canada Actuarial Science Section (2016 – 2019)

Scholarly Research

[1] T. Bae and A. Volodin. (2022) Type-II generalized crack distribution with application to heavy-tailed data modeling. Journal of Statistical Theory and Practice, DOI:10.1007/s42519-022-00281-9.
[2] T. Bae and Y. Choi. (2022) A bivariate extension of three-parameter generalized crack distribution for loss severity modelling. Journal of the Korean Statistical Society, 51: 378 – 402.
[3] T. Bae. (2021) Robust minimum bias iteration algorithms for classification ratemaking and loss reserving. Accepted for publication in Lobachevskii Journal of Mathematics.
[4] T. Bae and B. Ko. (2020) On the mixtures of length-biased Weibull distributions for loss severity modelling, Journal of the Korean Statistical Society, 49: 422 – 438.
[5] T. Bae and M. Mazjini. (2019) Backward simulation of correlated negative binomial L´evy process, Mathematics and Statistics, 7 (5): 191 – 196.
[6] K. Fraser, D. Garand, C. Zaluski, D. Swiderek, S. Swenarchuk, M. Worden and T. Bae (2018) Predictive Analytic Models for Canadian Group Disability Termination Experience, Research Council - Experience Research Committee, Canadian Institute of Actuaries.
[7] T. Bae and R. Kulperger. (2018) Poisson limits for sequential multivariate multinomial Data. Lobachevskii Journal of Mathematics, 39 (3): 321 – 330.

[8] T. Bae and J. Chen. (2017) On heavy-tailed crack distributions for loss severity modeling. International Journal of Statistics and Probability, 6 (6): 92 – 110.
[9] J. Kim, T. Bae and S. Kim. (2017) Application of the phase-type mortality law to life contingencies and risk management. Applied Stochastic Models in Business and Industry, 33: 184 – 212.
[10] T. Bae and A. Kreinin. (2017) A backward construction and simulation of correlated Poisson processes. Journal of Statistical Computation and Simulation, 87 (8): 1593 –1607.
[11] T. Bae and B. Ko. (2016) On weighted infinite sums of dependent random variables with regularly varying tails. Journal of the Korean Statistical Society, 46 (3): 321 - 327.
[12] T. Bae and C. Kim. (2016) Options and swaps on motor claims. Insurance and Risk Management, 83 (1-2): 45 – 69.
[13] T. Bae and I. Iscoe. (2016) On the limit of conditional Spearman rho under the common factor model. Extremes, 19 (1): 51 – 78.
[14] T. Bae, Huong and B. Ko. (2015) On the valuation of GMDB options using a combination of exponentials. The Journal of Risk Management, 26 (3): 71 – 99.
[15] B. Ko. and T. Bae. (2015) Pricing GMDB under the phase-type law of mortality. Lobachevskii Journal of Mathematics, 36 (2): 199–208.
[16] T. Bae, I. Iscoe and C. Kim. (2015) Valuing retail credit tranches with structural, double mixture models. Journal of Futures Markets, 35 (9): 849 – 867.
[17] T. Bae and I. Iscoe. (2014) Sum of Bernoulli mixtures: beyond conditional independence. Journal of Probability and Statistics, Volume 2014, Article ID 838625.
[18] T. Bae and B. Ko. (2013) Pricing maturity guarantee under a refracted Brownian motion. Lobachevskii Journal of Mathematics, 34 (3): 234 –247.
[19] T. Bae and I. Iscoe. (2012) Sovereign correlation in recent recessions. International Review of Applied Financial Issues and Economics, 4(1): 11-21.
[20] T. Bae and I. Iscoe. (2012) Large-sample confidence intervals for risk measures of location-scale families. Journal of Statistical Planning and Inference, 142: 2032–2046.

Sarah Carnochan Naqvi

Laboratory Instructor III

Sarah.Carnochan.Naqvi@uregina.ca, (306) 337-2338,

Education and Professional Development

UNIVERSITY 2001	University of Regina, Faculty of Graduate Studies Master of Science, in Mathematics
1998	University of Regina, Faculty of Science Bachelor of Science, High Honours in Combined Mathematics and Computer Science with a Cooperative Education Program Designation
TECHNICAL 1987	Wascana Institute of Applied Arts and Sciences Certificate in Secretarial Studies
OTHER COURSES	
2016	Online Course Statistical Learning, Stanford University
2014	Completed Course Work for Master of Online Teaching Certificate, Weber State University.
2014	Linear and Discrete Optimization, Data Analysis and Statistical Inference, Linear and Integer Programming, Coursera.org
2013	Institut Francais, University of Regina, Taste of French, Levels 1, 2, 3
2012	CS101 Introduction to Computer Science, Building a Search Engine, Udacity.com.
2008	Dreamweaver CS3 Level 1, Microage Training Centre
2002	SAS Certified Professional V8, SAS Institute

1984 and 1988	Completed courses in Introductory Accounting and Commercial Law. Society of Management Accounts

SEMINARS AND WORKSHOPS

October, 2019	Science Educational Resource Center (SERC), Carleton College, Northfield, Minnesota Participated in the Teaching Computational Thinking with MATLAB Workshop
July - August, 2002	Department of Mathematics and Statistics, University of Regina Participated in the Graduate Student Workshop on Combinatorial Matrix Theory.
February, 2002	Gwenna Moss Teaching and Learning Centre, University of Saskatchewan. Attended the Teaching Well Using Technology Workshop

Employment History

July, 2001 - Present	**University of Regina**, Regina, SK Laboratory Instructor III

Teaching History

Courses: Math 329, Math/Stat 902

Labs: Stat 354, CS/Math 261, Acsc/Stat 300, Stat 357, Acsc/Stat 418, Math 329, Stat 485, Stat 384, Stat 362

Student Supervision

None

University Service

Participate 2SLBGTQ+ in Stem	2021-present
Member Executive of Council	2020-2022
Indigenous Science Summer Camp	2021, 2022
Participate in Treaty 4 Activity	2019, 2021
Department Committee to Develop Data Science Program and Statistics Honours	2021
Science Website Team	2021-2022
Department Undergraduate Committee	2020-present
Manage TA and Grad equipment signout	2020-present
Manage Department Website	2007-present
Manage Department Library	2017-present
Manage Department Equipment for Grad Students, Post Docs, Sessionals and Visitors	2007-present
ILAS-Net Manager	2007-2022
Manager of ILAS International Center (IIC)	2007-2021
Assistant Managing Editor, Electronic Journal of Linear Algebra (ELA)	2007-2020
University of Regina Women in Science and Engineering (URWISE) Secretary, 2007-2013 Maintain website and email list, 2019-2021	2019-2021, 2007-2015
Executive, Regina SAS Users Group	2013-2018

Scholarly Research

N/A

Dianliang Deng

Full Professor

DianLiang.Deng@uregina.ca, (306) 585-4344,

Education and Professional Development

PhD. in Statistics, University of Windsor, Windsor, ON Canada

MSc in Statistics, University of Windsor, Windsor, ON Canada

MSc in Probability and Mathematical Statistics, Jilin University, Changchun, JL China

BSc. In Mathematics, Jilin University, Changchun, JL China

Employment History

Full Professor, From 2010- Present

Teaching History

Applied Stochastics Processes (201730), Introduction to Probability (201230,201630,201730), Introduction to Statistical Inferences (201310,201510,201910), Biostatistics (201330), Intermediate Probability (201830,201930), Sampling Theory (201410,201810), Nonparametric Statistics (201210,201430), (Advanced) Survival Analysis (201210,101310,201410,201510,201710,201910, 202010,202210, 202310), Statistical Inferences (201810,202010,202110,202210,202310), Design and Analysis of Experiments (201230-201430, 201630-202130, 202330), Bootstrap Methods (202110),

Student Supervision

Name	Position	Dates of supervision
Huihan Gong	Master of Science in Statistics	Sept. 2010-Aug. 2012(supervisor)
Ruili Li	Master of Science in Statistics	Sept. 2012-Aug. 2014(supervisor)
Kian Razeghi Jahromi	PhD in Statistics	Sept. 2011-Aug. 2015(supervisor)
Yun Gao	Master of Science in Statistics	Sept. 2013-Aug. 2015(supervisor)
Yiguang Sun	Master of Science in Statistics	Sept. 2014-Aug. 2016 (supervisor)
Yingjie Wei	Master of Science in Statistics	Jan. 2017-Dec. 2018 (supervisor)
Mashfiqul Chowdhury	Master of Science in Statistics	Jan. 2017-Dec. 2012 (supervisor)
Bowen Ji	Master of Science in Statistics	Sept. 2017-Aug. 2019 (supervisor)
Luya Shi	Master of Science in Statistics	Sept. 2017-Aug. 2019 (supervisor)
Xiufang Liu	PhD in Statistics	Sept. 2018-Aug. 2019(co-supervisor)
Xiaoqing Zhang	Master of Science in Statistics	Sept. 2019-Aug. 2021(supervisor)

Yihang Li	Master of Science in Statistics	Sept. 2020-Aug. 2022(supervisor)
Wei Xiong	PhD in Statistics	Sept. 2021-Sept. 2022(co-supervisor)
Jie Huang	PhD in Statistics	Sept. 2021-Sept. 2022(co-supervisor)
Simeng Li	PhD in Statistics	Jan. 2022-Jan. 2023 (co-supervisor)
Arfa Khalid	Master of Science in Statistics	Sept. 2021-Aug. 2023(supervisor)
Xiaoqing Zhang	PhD in Statistics	Sept. 2021-Aug. 2025(supervisor)
Qi Lyu	PhD in Statistics	Sept. 2019-Aug. 2023 (co-supervisor)
Meiqin Suo	PhD in Environmental Systems Engineering	Sept. 2010-Aug. 2012(co-supervisor)

University Service

Executive of Council Member, Serve as acting head when head was away in Department of Mathematics and Statistics, Member of the Statistics Search Committee for the Department, Member of Department Research Committee, Member of Graduate Scholarship Committee in the Department of Mathematics and Statistics, The local representative of SSC in University of Regina, The local representative of Probability Section of SSC in University of Regina, Participated and assisted to organize the MATH CAMPS and for high school students in Regina and supplied some necessary facilities. Judge in Mathematics Enrichment Camp Judge, Regina Regional Science Fair Judge, Regina Regional Science Fair Provided the statistical consulting, The local representative of CASSI in University of Regina. The member of Statistical Society of Canada, the member of The American Statistical Association. The member of International Chinese Statistical Association. Serve as the external examiners for PhD candidates in other Canadian universities.

Scholarly Research

*Xiong W, Wang D, **Deng D**, Wang X and Zhang W. Penalized multiply robust estimation in high-order autoregressive processes with missing explanatory variables, Journal of Multivariate Analysis, 187(2022), 1-15 https://doi.org/10.1016/j.jmva.2021.104867.

Deng D and *Chowdhury M. Quantile regression approach for analyzing similarity of gene expressions under multiple biological conditions, Stats (2022) 5, 583–605. https:// doi.org/10.3390/stats5030036

Deng D, *Sun Y and Tian GL. A multivariate zero-inflated binomial model for the analysis of correlated proportional data, Journal of Applied Statistics, (2022)49:11, 2740-2766; https://doi.org/ 0.1080/ 02664763.2021.1918649

*Liu X, Wang W, **Deng D**, Cheng J and Lu F. Maximum likelihood estimation of the DDRCINAR(p) model, Communications in Statistics - Theory and Methods, (2021)50:24, 6231-6255, DOI: 10.1080/03610926. 2020.1741627.

*Liu X, **Deng D** and Wang D. Estimating the quantile medical cost under time-dependent covariates and right censored time-to-event variable based on a state process, Statistical Methods in Medical Research (2020)29(8), 2041–2062; https:// doi.org/10.1177/0962280219882968.

Deng D, *Jahromi KR and Zhou Z. Influence of biological conditions to temporal gene expression based on variance analysis, Proceedings of America Statistical Association, (2017), 786-800.

Deng D, Fang HB, *Jahromi KR, Song J and Tan T. Detection of threshold points for gene expressions under multiple biological conditions, Statistics and Its Interface, (2017)10, 643 - 655, DOI: http://dx.doi.org /10.4310/SII.2017.v10.n4.a9.

Deng D. Estimating the cumulative mean function for history process with time dependent covariates and censoring mechanism, Statistics in Medicine (2016)35, 4624-4636, DOI: 10.1002/sim. 6998

Deng D and Paul SR. Goodness of fit of multinomial regression models to sparse data, Sankhya: The Indian Journal of Statistics (B). (2016) 78, 78-95, DOI: 10.1007/s13571-015-0109-z.

Tian GL, Ma H, Zhou Y and **Deng D**. Generalized endpoint-inflated binomial model. Computational Statistics and Data Analysis, (2015) 89, 97-114; doi:10.1016/j.csda.2015.03.009.

Deng D and *Zhang Y. Score tests for both extra zeros and extra ones in binomial mixed regression models. Communications in Statistics: Theory and Methods, (2015) 44, 2881-2897; DOI: 10.1080/03610926.2013.809118.

Deng D and Hu Z. Precise asymptotics in strong limit theorems for self-normalized sums of multidimensionally indexed random variables, Asymptotic Laws and Methods in Stochastics, Volume *76* of the series Fields Institute Communications (2015)17-41. DOI:10.1007/978-1-4939-3076-02

Fang H, **Deng D**, *Zhang T and Tan M. Modeling the sustained effect of anticancer drug in tumor xenograft experiments, Journal of Biopharmaceutical Statistics (2014) 24(4), 755-767; DOI: 10.1080/10543406.2014.901340.

*Suo MQ, Li YP, Huang GH, **Deng D** and Li YF. Electric power system planning under uncertainty using inexact inventory nonlinear programming method, Journal of Environmental Informatics 22(2013), 49-67.

Fang H, **Deng D**, Tian G, Shen L, Duan K and Song J. Analysis for temporal gene expression under multiple biological conditions, Statistics in Biosciences. (2012) 4(2), 282-299, DOI: 10.1007/s12561-012-9063-8

Paul SR and **Deng D**. Assessing goodness of fit of generalized linear models to sparse data using higher order moment corrections, Sankhya: The Indian Journal of Statistics (B) 74(2)(2012), pp 195-210, DOI: 10.1007/s13571-012-0037-0.

Note: The names with * were my master or PhD students

Peter Douglas

Position Instructor III

peter.douglas@uregina.ca, (306) 585 4346,

Education and Professional Development

B.Ed. University of British Columbia 1984

BSc (Math) Dalhousie 1985

Fellow of Society of Actuaries 1991

Fellow of Canadian Institute of Actuaries 1991

Employment History

Have been a tenured Instructor III for more than. 10 years.

Teaching History

ACSC116 (6 times), ACSC216 (2 times), ACSC217. (4 times), ACSC316 (6 times), ACSC317 (4 times), ACSC318 (6 times), ACSC418 (2 times), ACSC419 (2 times)

MATH103 (1 time), MATH110 (1 time)

STAT100 (3 times), STAT251 (2 times), STAT354 (1 time)

University Service

Member of the URFA Pension and Benefits Committee for 10+ years, chair since 2018.

Member of the University Academic and Administrative Benefits Committee, chair since 2018.

Member of the University Joint Pension Investment Committee, co-chair since 2018

External Actuary to the Saskatchewan Workers' Compensation Board (representing 1/3 of my time at the University) until July 1, 2022.

Served on numerous Canadian Institute of Actuaries Committees, Task Force and Councils (see attached list)

Current member of the Society of Actuaries Exam Committees for exams ALTAM and ASTAM and similar committees for exams MLC and LTAM.

Scholarly Research

I provide Service activities in lieu of Research.

Current CIA Committee Involvement

Education Syllabus and Assessments Committee – ACIA Education Syllabus and Assessments Subcommittee since 24/06/2022

Education Syllabus and Assessment Committee since 01/04/2021

Committee on Workers' Compensation since 29/05/2017

Past CIA Committee Involvement

ACIA Education and Exam Working Group 08/04/2021-24/06/2022

Education and Qualification Council 01/01/2020-01/07/2021

Eligibility and Education Council 01/07/2018-31/12/2019

Committee on Climate Change and Sustainability 05/09/2017-01/09/2018

Investment Practice Committee 05/09/2017- 01/09/2018

Practice Council 27/09/2017-30/06/2018

Member Services Council 30/09/2015- 30/06/2017

Research Committee 16/10/2015-29/09/2016

Accreditation Committee 28/10/2008-30/06/2014

Juliana Erlijman

Associate Professor

Juliana.Erlijman@uregina.ca, (306) 585-4338,

Education and Professional Development

- Ph.D. in Mathematics (1995, University of Iowa).
- Licenciatura en Matemática (1989, Universidad Nacional de Buenos Aires, Argentina)

Employment History

- Associate Professor (2012–, University of Regina)

Teaching History

- Math 122 (Linear Algebra I; Winter 2015, 2016; Fall 2017, 2018, 2019)
- Math 221 (Introduction to Proofs and Problem Solving; Fall 2013, 2014, 2015, 2016, Winter 2018, 2020)
- Math 222 (Linear Algebra II; Winter 2014)
- Math 223 (Introduction to Abstract Algebra; Fall 2015, 2018; Winter 2018, 2019)
- Math 305 (Introductory Mathematical Analysis; Winter 2019, 2020)
- Math 313 (Mathematical Analysis II; Fall 2019, 2022)
- Math 323 (Modern Algebra I; Winter 2014, 2015, 2016)
- Math 441/841 (General Topology; Fall 2014, 2022)
- Math 423/823 (Modern Algebra II; Fall 2016, 2017)
- Math 485/813 (Functional Analysis; Fall 2018)

Student Supervision

Name	Position	Dates of supervision
Akina Kuperus,	Honours student	2019-2021
Alexander Nau	NSERC USRA	Summer 2017, Summer 2018

Kyle Thompson	NSERC USRA	Summer 2016
Ahmed Ahlbakari	Summer Research Assistant	Summer 2015
Adam Gorr	Summer Research Assistant	Summer 2013
Rachelle Lee	Summer Research Assistant	Summer 2013
Rhodri Simmonds	Summer Research Assistant	Summer 2013, co-supervised with D. Farenick

University Service

- **Department of Mathematics and Statistics**

- Research Committee member, 2017.
- Committee of Undergraduate Studies, 2015-2017.
- Student and Faculty Engagement Group, 2014-2015.
- Computer and Teaching Technology Advisory Group, 2014-2015.
- Student and Faculty Engagement Working Group, 2013.
- Curriculum Committee, 2022-.

- **Faculty of Science**

- Geology Search Committee, 2014, for tenure-track Lecturer.

- **Faculty of Graduate Studies and Research**

- Faculty of Graduate Studies and Research Council, 2013-2015.
- NSERC Doctoral Selection Committee, 2013.

- **Other**

- Chair for Masters of Applied Science Thesis Defense. Mr. Nathan Abraham David, Department of Petroleum System Engineering, July 2018

Shaun M. Fallat

Professor, Mathematics and Statistics

shaun.fallat@uregina.ca, (306) 585 4107,

Education and Professional Development

Ph.D. in Applied Mathematics, The College of William and Mary, May 1999,
MSc. in Mathematics, University of Victoria, June 1996,
BSc. (with honours) in Statistics; University of Victoria, May 1994.

Employment History

07/2008 -- Present: Full Professor, Department of Mathematics & Statistics, University of Regina,
07/2016 -- 06/2020: Department Head, Department of Mathematics and Statistics, University of Regina,
07/2003 -- 06/2008: Associate Professor, Department of Mathematics & Statistics, University of Regina,
07/1999 -- 06/2003: Assistant Professor (tenure-track), Department of Mathematics & Statistics, University of Regina.

Teaching History

Mathematics 103 - Applied Calculus
Mathematics 111 – Calculus II
Mathematics 127 – Introduction to Finite Mathematics II
Mathematics 223 – Introduction to Abstract Algebra (2 times)
Mathematics 305 – Introductory Mathematical Analysis
Mathematics 327 – Introductory Combinatorics (3 times)
Mathematics 329 – Linear and Discrete Optimization (3 times)
Mathematics 422/822 – Abstract Linear Algebra
Mathematics 426/826 – Combinatorial Matrix Theory (2 times)
Statistics 160 – Introductory Statistics (4 times)
Statistics 251 – Introduction to Probability
Statistics 252 – Introduction to Statistical Inference (4 times)

Student Supervision

Name	Position	Dates of supervision
Prateek K. Vishwakarma	PIMS Post-Doctoral Fellow	Feb. 2022 - present
S. Ahmad Mojallal	PIMS Post-Doctoral Fellow	August 2020 – present
Mohammad Adm	DAAD Post-Doctoral Fellow	Feb. 2017 – Jan. 2018
Ryan Tifenbach	PIMS Post-Doctoral Fellow	July 2014 – June 2016
Shahla Nasserasr	PIMS Post-Doctoral Fellow	Sept. 2011 – August 2013
Tannen Acoose	Doctoral Student	Sept. 2019 - present
A. Sarobidy Razafimahatratra	Doctoral Student	Sept. 2018 – April 2022

Masha N. Shirazi	Doctoral Student	Jan. 2018 – April 2022
Gurmail Singh	Doctoral Student	Sept. 2011 – August 2015
Fatemeh Alinaghibour	Doctoral Student	Sept. 2009 – August 2013
Brendan Andrusiak	Masters Student	Sept. 2020 - present
Johnna Parenteau	Masters Student	Sept. 2022 - present
Abolghasem S. Kafrani	Masters Student	May 2019 – May 2021
Daniel Palmarin	Masters Student	Jan. 2016 – Nov. 2020
Prateek K. Vishwakarma	Visiting Doctoral Student (QE II Jubilee Scholar)	Sept. 2019 – Dec. 2019
Priyanka Guliani	Masters Student	Jan. 2016 – Nov. 2018
Rana Alahmadi	Masters Student	Jan. 2016 – August 2017
Adam Gorr	Masters Student	Jan. 2016 – August 2018
Ryan Bergen	Masters Student	Sept. 2015 – August 2017
Ryan Tessier	Masters Student	Sept. 2011 – July 2013
Johnna Parenteau	NSERC URSA	Summers 2019, 2020, 2021
Kendra Lemieux	NSERC URSA	Summers 2020, 2021
Tara Petrie	NSERC URSA	Summers 2013, 2014
Valerii Maliuk	MITACS Globalink Internship	Summer 2021
J. Miguel Martinez C.	MITACS Globalink Internship	Summer 2016

University Service

Professional Service:

Associate Editor, Canadian Journal of Mathematics & Canadian Mathematics Bulletin (01/22 - 12/27).
Problems Editor, Crux Mathematicorum (07/16-12/21).
Associate Editor of the international journal Linear and Multilinear Algebra (01/08-12/14).
Associate Editor of the international journal Linear Algebra and its Applications' (01/05-present).
Member of the Olga Tauskky-Todd Lecture Selection Committee, Chair of the 2014 International Linear Algebra Society Nominating Committee, Member of the International Linear Algebra Society Program Review Committee
Member of the PIMS Postdoctoral Selection Panel (2013 -- 2016)

University Service:

Delivered a lecture on Mathematics at the University of Regina, Science Sneak Peek, April 2021. Delivered the `Expectations' lecture at Student Orientation, 2019.
Delivered a public lecture on March Madness for π-day activities, March 2019.
Volunteered in the Mathematics Enrichment Camp, March 2019
Executive of Council (07/16-06/18); 1 year member of the Campus Promotion Committee
Member of an NSERC Panel hosted by the Office of Research, Innovation and Partnership, Oct. 2014.
Co-delivered two lectures on `Teaching Large Classes' during two workshops hosted by the Centre for Teaching and Learning, Summer 2014 (with Dr. P. Ouimet from Physics).
Member of the Faculty of Graduate Studies and Research, Ph.D. Committee (2011-2014)
University of Regina Site Director for the Pacific Institute for the Mathematical Sciences

Faculty of Science Committee Work:

Member of the Academic Performance Review Committee (09/22-08/24)
Member of the Science Speakers Bureau (09/16-08/18)
Member of Deans Executive Council (07/16-06/20)

Department Committee Work:

Chair of a Search Committee for a tenure-track position in Statistics (09/21-02/22)
Member of the Graduate Studies Committee (07/21-06/23)
Department Head of the Department of Mathematics and Statistics (07/16-06/20)
Chair of the Undergraduate Studies Committee, and Undergraduate Coordinator (07/14-06/15)

Public Service:
Delivered a lecture at Science Sneak Peek (U. Regina), March 2021.
Delivered lectures on `Transitioning from High School to University' and on a mathematics topics at local high schools: F.W. Johnson, Leboldus, Thom, Campbell, O'Neil, Sheldon Williams, Regina Huda, and Harvest City.
Delivered a lecture to students in grades 3-7 on `Fun with Mathematics' at the Montessori School in Regina, December, 2020.
Invited to deliver a public lecture at the University of Regina on the number π in honour of π-day, March 13, 2020 *Numerology: Curious superstitions and wonder*.
Met with Mathematics teachers at Luther High School and Sheldon high school to discuss issues with transitioning and on extra curricula topics to be discussed with students various grade 12 math classes.
Met with a group of Mathematics teachers at the Regina Schools Board
Judge, Regina Regional Science Fair (03/04, 03/08, 03/10, 03/12, 03/13, 03/15, 03/16, 03/17, 03/18).
Judge, Canada-Wide Science Fair, Regina, SK (May 2017).

Scholarly Research

- S. Fallat and C. Johnson, Totally Nonnegative Matrices, Princeton University Press, Princeton. 2011.
- The bifurcation lemma for strong properties in the inverse eigenvalue problem of a graph (with J. C.-H. Lin, H.T. Hall, and B. Shader). Linear Algebra and its applications, Vol. 648:70—87, 2022.
- On the minimum number of distinct eigenvalues of a threshold graph (with S.A. Mojallal*). Linear Algebra and its applications, Vol. 642:1--29, 2022.
- The Erdös-Ko-Rado theorem for 2-intersecting families of perfect matchings (with K. Meagher and Mahsa N. Shirazi*). Algebraic Combinatorics, Vol. 4:575-598, 2021.
- Sums of rank-one matrices and ranks of principal submatrices (with R. Tifenbach*). Linear and Multilinear Algebra, Vol. 69:9-18, 2021.
- Weakly Hadamard diagonalizable graphs (with M. Adm, K. Almuhtaseb, K. Meagher, S. Nasserasr, M. Shirazi*, A. Razafimahatratra*). Linear Algebra and its Applications. Vol. 610:86–-119, 2021.
- Properties of a q-analogue of zero forcing (with S. Butler, H.T. Hall, B. Kroschel, B. Shader, N. Warnberg, B. Yang). Graphs and Combinatorics, Vol. 36:1401-1419, 2020.
- On the almost principal minors of a symmetric matrix (with X Martinez-Rivera*). Linear Algebra and its Applications. Vol. 606:219-243, 2020.
- Complex Hadamard diagonalisable graphs (with A. Chan, S. Kirkland, C.-H. Lin, S. Nasserasr, S. Plosker. Linear Algebra and its Application. Vol. 605:158–-179, 2020.
- The inverse eigenvalue problem of a graph: multiplicities and minors (with W. Barrett, S. Butler, H.T. Hall, L. Hogben, J. C.-H. Lin, B. Shader, M. Young). Journal of Combinatorial Theory, Series B. Vol. 142:276-306, 2020.
- The maximum multiplicity of the kth largest eigenvalue in a matrix whose graph is acyclic or unicyclic (with M. Adm*). Discrete Mathematics, Vol. 342:2924-2950, 2019.
- Achievable multiplicity partitions in the inverse eigenvalue problem of a graph (with M. Adm*, K. Meagher, S. Nasserasr, S. Plosker, and B. Yang. Special Matrices, Vol. 7:276-290, 2019.
- Infections in Hypergraphs (with R. Bergen*, A. Gorr*, F. Ihringer*, K. Meagher, A. Purdy*, B. Yang, and G. Yu). Discrete Applied Mathematics, Vol. 237:43-56, 2018.
- The quasi principal rank characteristic sequence (with X Martinez-Rivera*). Linear Algebra and its Applications. Vol. 548:42-56, 2018.
- Further Applications of the Cauchon algorithm to rank determination and bidiagonal factorization (with M. Adm*, K Al Muhtaseb, A. Abedel Ghani, J. Garloff). Linear Algebra and its Applications. Vol. 545:240-255, 2018.
- Total Positivity of Sums, Hadamard Products and Hadamard Powers: Results and Counterexamples (with C. Johnson and A. Sokal). Linear Algebra and its Applications. Vol. 520:242-259, 2017.
- Total Positivity in Markov Structures (with S. Lauritzen, K. Sadeghi, C. Uhler, N. Wermuth, P. Zwiernik). Annals of Statistics, Vol. 45, 1152-1184, 2017.

- Generalizations of the Strong Arnold Property and the Minimum Number of Distinct Eigenvalues of a graph (with W. Barrett, H.T. Hall, L. Hogben, J. Lin*, and B. Shader). Electronic Journal of Combinatorics, Vol. 24, 2017.
- Compressed Cliques Graphs, Clique Coverings and Positive Zero Forcing (with K. Meagher, A. Soltani* and B. Yang). Journal Theoretical Computer Science, 2017.
- Line Graphs: Their Maximum Nullities and Zero Forcing Numbers (with A. Soltani*). Czechoslovak Mathematical Journal, Vol. 66:743--755, 2016.
- The Enhanced Principal Rank Characteristic Sequence (with S. Bulter, M. Catral, H.T. Hall, L. Hogben, P. van den Driessche, M. Young*). Linear Algebra and its Applications, Vol. 498:181--200, 2016.
- On the Complexity of the Positive Semidefinite Zero Forcing Number (with K. Meagher and B. Yang). Linear Algebra and its Applications, Vol. 491:101--122, 2016.
- The Enhanced Principal Rank Characteristic Sequence for Skew-Symmetric Matrices (with D. Olesky and P. van den Driessche). Linear Algebra and its Applications, Vol. 498:366--377, 2016.
- The Maximum Nullity of a Complete Subdivision Graph is Equal to its Zero Forcing Number (with W. Barrett, S. Bulter, M. Catral, H.T. Hall, L. Hogben, M. Young*). Electronic Journal of Linear Algebra}, 27:444--457, 2014.
- The Principal Rank Characteristic Sequence over various Fields (with W. Barrett, S. Bulter, M. Catral, H.T. Hall, L. Hogben, P. van den Driessche, M. Young*). Linear Algebra and its Applications, 459:222--236, 2014.
- On the Relationships between Zero Forcing Numbers and Certain Graph Coverings (with F. Alinaghipour*, K. Meagher). Special Matrices, 2:30--45, 2014.
- Note on Nordhaus-Gaddum problems for Colin de Verdiere type parameters (with W. Barrett, H.T. Hall, L. Hogben). The Electronic Journal of Combinatorics, Volume 20 P56, 2013.
- Minimum Number of Distinct Eigenvalues of Graphs (with B. Ahmadi*, F. Alinaghipour*, M.S. Cavers, K. Meagher, S. Nasserasr*). The Electronic Journal of Linear Algebra, Vol. 26:673--691, 2013.
- Parameters related to tree-width, zero forcing, and maximum nullity of a graph, AIM Squares Group. Journal of Graph Theory, 72:146-177 (2013).
- Colin de Verdiere Parameters of Chordal graphs (with L. Mitchell). The Electronic Journal of Linear Algebra, 26:49--62 (2013).
- On the null space structure associated with trees and cycles (with S. Nasserasr*). Journal of Combinatorial Mathematics and Combinatorial Computing}, 85:253--272 (2013).
- Edge bipartiteness and the Signless Laplacian Spread of Graphs (with Y.-Z. Fan). Applicable Analysis and Discrete Mathematics Vol. 6:31--45 (2012).
- Skew-adjacency matrices of graphs (with M. Cavers, S. Cioaba, D. Gregory, W. Haemers, S. Kirkland, J. McDonald, and M. Tsatsomeros) Linear Algebra and its Applications Vol. 436:4512--4529 (2012).
- On the graph complement conjecture for minimum rank (with F. Barioli, W. Barrett, T. Hall, L. Hogben, H. van der Holst) Linear Algebra and its Applications Vol. 436:4373--4391 (2012).
- Bipartiteness and the least Eigenvalue of the Signless Laplacian of Graphs (with Y.-Z. Fan). Linear Algebra and its Applications Vol. 436:3254--3267 (2012).
- The minimum rank of universal adjacency matrices (with B. Ahmadi*, F. Alinaghipour*, Y.-Z. Fan, K. Meagher, S. Nasserasr*) Linear Algebra and its Applications Vol. 437:2064--2076 (2012).
- On the spread of Normal Matrices (with Y.-J. Xing*). Linear and Multilinear Algebra Vol 60:1391--1407 (2012).
- Allow problems concerning spectral properties of patterns (with M.S. Cavers) Electronic Journal of Linear Algebra Vol. 23:731--754 (2012).

Douglas Farenick

Professor of Mathematics; Dean of Science

douglas.farenick@uregina.ca, (306) 585-4143

Education and Professional Development

PhD	Mathematics, University of Toronto, 1990
MSc	Pure Mathematics, University of Calgary, 1986
BSc	Mathematics and Computer Science, University of Regina, 1986

Employment History

Academic (last ten years)

Professor	University of Regina

Leadership (last ten years)

Dean	Faculty of Science, University of Regina, 2017-2022; renewed 2022-2027
Acting Dean	Faculty of Science, University of Regina, 2016-2017
Department Head	Department of Mathematics & Statistics, University of Regina, 2012-2016

Teaching History

PMTH 092 (Pre-College Math)	F2021, W2022, F2022	[online asynchronous course]
MATH 103 (Applied Calculus I)	F2020, F2022	[online asynchronous course]
MATH 110 (Calculus I)	W2012, F2014	
MATH 111 (Calculus II)	W2014	
MATH 122 (Linear Algebra I)	F2012	
MATH 213 (Vector Calculus)	W2016	
MATH 217 (Differential Equations)	F2014	
MATH 223 (Introduction to Modern Algebra)	F2018	[co-taught with S. Fallat & K.Meagher]
MATH 312 (Complex Analysis I)	F2015	
MATH 401/890AI (Matrix Lie Groups)	W2013	
MATH 411/810 (Measure and Integration)	W2012	
MATH 441/841 (Topology)	F2013	[University of Regina & University of Saskatchewan]
MATH 416/816 (Quantum Information Theory)	W2019	
Abstract Linear Algebra	F2017	[African Institute for Mathematical Science (Kigali)]

Student Supervision

Name	Position	Dates of supervision
Samir Raouafi	Postdoctoral Fellow (PhD Université Laval)	01 Sep 2015 – 31 Aug 2017
Shawn McCann	Postdoctoral Fellow (PhD University of Calgary)	01 Sep 2012 – 31 Aug 2014
Ryan Tessier	Ph.D.	01 Sep 2014 – 31 Dec 2020
Mizanur Rahaman	Ph.D.	01 Sep 2013 – 31 Aug 2017
Angshuman Bhattacharya	Ph.D.	01 Sep 2010 – 31 Aug 2014
Olwatobi Ruth Ojo	M.Sc.	01 Sep 2019 – 31 Aug 2021
Adili Masanika	M.Sc.	01 Jan 2019 – 31 Aug 2020
Michelle McBurney	B.Sc.	01 May 2022 – 31 Aug 2022
Madeline Young	B.Sc. (Univ of Waterloo)	01 Sep 2018 – 31 Dec 2018
Samuel Jacques	B.Sc. Hons.	01 May 2015 – 31 Aug 2015 01 Jan 2017 – 30 Apr 2017
Charlyana McGill	B.Sc.	01 May 2015 – 31 Aug 2015 01 May 2014 – 31 Aug 2014
Adam Gorr	B.Sc. Hons.	01 May 2014 – 31 Aug 2014
Natalia Filomeno	B.Sc.	01 May 2014 – 31 Aug 2014 01 May 2013 – 31 Aug 2013

University Service

Professional

Canadian Council of Deans of Science	President 2020-2022 Vice President 2018-2020
Canadian Mathematical Society	Scientific Organising Cte for CMS Conference 2023 Nominating Committee 2020-2024 Women in Mathematics Committee 2018-2019 Vice President (West) 2017-2019 Finance Committee Chair 2012-2015
TRIUMF Particle Accelerator	Members' Council, Nominating Cte Chair 2022-2023 Members' Council 2022-2025 Board of Management 2018-2022
Pacific Institute for the Mathematical Sciences	Board of Directors 2016-2023
Academic Unit Review Teams	Nipissing University 2019 Western University 2019

Community

Science Camps for Saskatchewan Indigenous Youth	2021-2023 (supported by NSERC Promo Science)
Canada Wide Science Fair	Judge 2017
Swim Sask	Board of Directors 2015-2018
Regina Masters Swim Club	President 2015-2018; Vice President 2012-2015
Queen City Kinsman Gymanstics Club	Co-Chair of the Board 2015; Treasurer 2013-2015

Scholarly Research

Books

1. D. Farenick, *Fundamentals of Functional Analysis,* Springer, New York, 2016.

Journal Articles [* indicates that the coauthor is, or was, a student or postdoctoral fellow under my supervision or co-supervision]

2. D. Farenick, R. Tessier*, *Purity of the embeddings of operator systems into their C*- and injective envelopes,* Pacific Journal of Mathematics 317 (2022), 317-338.
3. D. Farenick, R. Ojo*, S. Plosker, *Universality of Weyl unitaries,* Linear Algebra and its Applications 634 (2022), 57-76.
4. D. Farenick, *The operator system of Toeplitz matrices,* Transactions of the American Mathematical Society, Series B (2021), 999-1023.
5. D. Farenick, F. Huntinghawk, A. Masanika*, S. Plosker, *Complete order equivalence of spin unitaries,* Linear Algebra and its Applications 610 (2021), 1-28.
6. D. Farenick, A. Kavruk, V. Paulsen, I.G. Todorov, *Characterisations of the weak expectation property,* New York Journal of Mathematics 24a (2018), 107-135.
7. D. Farenick, M. Rahaman*, *Bures contractive channels on operator algebras,* New York Journal of Mathematics 23 (2017), 1369-1393.
8. D. Farenick, S. Jaques*, M. Rahaman*, *The fidelity of density operators in an operator-algebraic framework,* Journal of Mathematical Physics 57 (2016), 102202 (15pp).
9. D. Farenick, M. Mastnak, A. Popov, *Isometries of the Toeplitz matrix algebra,* Journal of Mathematical Analysis and Applications 434 (2016), 1612-1632.
10. D. Farenick, M. Kozdron, S. Plosker, *Spectra and variance of quantum random variables,* Journal of Mathematical Analysis and Applications, 434 (2016), 1106-122.
11. M. Argerami, D. Farenick, *C*-envelopes of Jordan operator systems,* Operators and Matrices 9 (2015), 325-341.
12. D. Farenick, A. Kavruk, V. Paulsen, I.G. Todorov, *Operator systems from discrete groups,* Communications in Mathematical Physics 329 (2014), 207-238.
13. A. Bhattacharya*, D. Farenick, *Crossed products of C*-algebras with the weak expectation property*, New York Journal of Mathematics 19 (2013), 423-429.
14. M. Argerami, D. Farenick, *The C*-envelope of an irreducible periodic weighted unilateral shift*, Integral Equations and Operator Theory 77 (2013), 199-210.
15. D. Farenick, A. Kavruk, V. Paulsen, *C*-algebras with the weak expectation property and a multivariable analogue of Ando's theorem on numerical radius*, Journal of Operator Theory 70 (2013), 573-590.
16. D. Farenick, R. Floricel, S. Plosker, *Approximately clean quantum probability measures*, Journal of Mathematical Physics 54 (2013), 52201 (15pp).
17. M. Argerami, D. Farenick, P. Massey, *Second-order local multiplier algebras of continuous trace C*-algebras*, Journal of Mathematical Analysis and Applications 397 (2013), 822-836.
18. M. Argerami, D. Farenick, P. Massey, *Injective envelopes and local multiplier algebras of some spatial continuous trace C*-algebras*, Quarterly Journal of Mathematics (Oxford) 63 (2012), 1-20.
19. D. Farenick, V. Paulsen, *Operator system quotients of matrix algebras and their tensor products*, Mathematica Scandinavica 111 (2012), 110-243.
20. D. Farenick, M.J. Kozdron, *Conditional expectation and Bayes' rule for quantum random variables and positive operator valued measures*, Journal of Mathematical Physics 53 (2012), 042201 (17pp).

Remus Floricel

Associate Professor

Remus.Floricel@uregina.ca, (306) 585 4351,

Education and Professional Development

PhD Mathematics, Queen's University, 2002
MSc Mathematics, University of Bucharest, 1997
BSc Mathematics, University of Bucharest, 1996

Employment History

Associate Professor University of Regina, 2011-present

Teaching History

MATH 110 (Calculus I)	W2014, F2019, F2020,
MATH 111 (Calculus II)	F 2013, F2018, W2022
MATH 213 (Vector Calculus)	F2013, W2016, W2018, W2020
MATH 217 (Differential Equations)	F2015, F2016, F2018, W2019
MATH 221 (Intro to Proofs)	F2020, W2021
MATH 305 (Mathematical Analysis I)	W 2014, W2017
MATH 312 (Complex Analysis I)	F2019, F2022
MATH 313 (Mathematical Analysis II)	F2014, F2016, F2017
MATH 412/812 (Complex Analysis II)	W2018
MATH 411/810 (Measure and Integration)	W 2015, W2016
MATH 441/841 (Topology)	F2018
MATH 485/813 (Functional Analysis)	F2014, F2021

Student Supervision

Name	Position	Dates of supervision
Yug Shah	NSERC USRA	Summer 2022
Peter Wadel	NSERC USRA	Summer 2022
Jason Zerr	NSERC USRA	Summer 2018 and 2019
Eleanor Lekach	NSERC USRA	Summer 2017
Mehwish Anwar	NSERC USRA	Summer 2017

Daniel Krumer	NSERC USRA	Summer 2014 and 2015
Avner Sadikov	MSc Student	2021-present. Co-supervised with S. Plosker
Michael Chesterton	MSc Student	2021-present. Co-supervised with S. Plosker
Patrick Melanson	MSc Student	2021-present
Daniel Krumer	MSc Student	2016-2018
Tianli Zhang	MSc Student	2011-2013
Tyler Wood	PhD Student	2016-2021
Brian Ketelboeter	PhD Student	2015-2019
Alaa Alzulaibani	PhD Student	2012-2016
Brian Ketelboeter	Postdoctoral fellow	2021-2022
Daniel Drimbe	PIMS postdoctoral fellow	2018-2020
Asghar Ghorbanpour	PIMS postdoctoral fellow	2015-2017
Gurmail Singh	Research associate	2019-2020
Mitra Dipra	Research associate	203-2014

University Service

Academic Service and Committee Work

- Head, Department of Mathematics & Statistics, University of Regina, July 2020 - present.
- PIMS site director, University of Regina, September 2016 - June 30, 2020.
- Chair, Research Committee, Department of Mathematics & Statistics, University of Regina, September 2013 - June 30, 2020.
- Member of the Scholarship Committee, Faculty of Graduate Studies, University of Regina, September 2019 -June 2020.
- Member of the Executive of Council, University of Regina, 2015-2017.
- Member of the Graduate Committee, Department of Mathematics & Statistics, University of Regina, 2013-2015.
- Acting PIMS site director, University of Regina, September 2014 - March 2015.
- Chair, Faculty Review Committee, Faculty of Science, University of Regina, September 2013 - April 2015.

Event organization

- 2019 Canadian Mathematical Society Summer Meeting: Finite and Infinite Dimensional Structures in Non-Commutative Analysis Regina, June 08-10, 2019 (co-organized with M. Argerami).
- 47th Canadian Operator Symposium, University of Regina, June 03-07, 2019 (co-organized with M. Argerami and D. Drimbe).

- 2012 Canadian Mathematical Society Summer Meeting: Operator Algebras, Regina, June 02-04, 2012 (co-organized with M. Argerami and J. Erlijman).

Refereeing and Reviewing

- Referee for Journal of Functional Analysis, Journal of Operator Theory, Journal of Mathematical Physics, Comptes rendus mathematiques de l'Academie des Sciences, Canada.
- Referee for the NSERC Discovery Grant Program (2013, 2022).
- Reviewer for the American Mathematical Society Math Reviews.

Scholarly Research

Refereed Journal Articles

- R. Floricel, A. Ghorbanpour. On inductive limit spectral triples. Proceeding of the American Mathematical Society, 147 (2019), no. 8, 611-3619.
- R. Floricel, A. Ghorbanpour, M. Khalkhali. The Ricci curvature in noncommutative geometry. Journal of Noncommutative Geometry, 13 (2019), no. 1, 269-296.
- R. Floricel, T. Wood. Quasi-pure E0-semigroups. J. Math. Anal. Appl., 469 (2019), no. 1, 447-456.
- R. Floricel. The enveloping E-semigroup of a product system. J. Math. Anal. Appl., 428 (2015), no. 2, 1173-1182.
- D. Farenick, R. Floricel, S. Plosker. Approximately clean quantum probability measures. J. Math. Phys., 54, (2013), no. 5, 052201.
- R. Floricel. Absence of gauge-invariant functionals on spectral C_-algebras. Arch. Math. (Basel)., 99, (2012), no. 5, 453 { 456.
- R. Floricel. Pure cocycle perturbations of E0-semigroups. Integral Equations Operator Theory, 74, (2012), no. 2, 189-198.

Invited Conference Presentations

- CMS Winter Meeting, Toronto, ON, Dec. 02-05, 2022. Presentation's title: C*-subproduct and product systems.
- CMS Summer Meeting, Ottawa, ON, June 07-11, 2021. Presentation's title: Inductive limits of spectral triples.
- CMS Winter Meeting, Montreal, QC, Dec. 04-07, 2015. Presentation's title: CCR subproduct systems.
- Random matrices, free probability and beyond, Kingston, ON, Oct.16-17, 2015. Presentation's title: The enveloping E-semigroups of a product system.
- Quantum Probability and Related Fields, Luminy, France, Oct. 01-05, 2012. Presentation's title: Asymptotic properties of quasi-shift endomorphisms of von Neumann algebras.

Martin Frankland

Associate Professor, Department of Mathematics and Statistics

Martin.Frankland@uregina.ca, (306) 585-4425

Education and Professional Development

Ph.D. Pure Mathematics, Massachusetts Institute of Technology, 2006–2010.

M.Sc. Mathematics, Université de Montréal, 2003–2005.

B.Sc. Mathematics, Université de Montréal, 2000–2003.

Employment History

Associate Professor, University of Regina, 2022–present. (With tenure starting July 1, 2022.)

Assistant Professor, University of Regina, 2018–2022.

Research Fellow, Universität Osnabrück, 2016–2018.

Visiting Scientist, Max-Planck-Institut für Mathematik Bonn, Sep. 2015 – Dec. 2015.

Postdoctoral Fellow, University of Western Ontario, 2013–2015.

Visiting Assistant Professor, University of Illinois at Urbana-Champaign, 2010–2013.

Teaching History

Regina

MATH 420/820 - Commutative Algebra (graduate).

MATH 122 - Linear Algebra I (x 2).

MATH 442/842 - Algebraic Topology (graduate).

MATH 322 - Matrix Theory.

MATH 849 - Topics in Topology (reading course).

MATH 441/841 - General Topology (graduate) (x 2).

MATH 111 - Calculus II (x 3).

MATH 231 - Euclidean Geometry (x 2).

MATH 213 - Vector Calculus (x 2).

Osnabrück

Algebraische Topologie (graduate, in German).

Western Ontario

Algebraic Topology (graduate).

Advanced Calculus I.

Methods of Finite Mathematics.

Intermediate Calculus I.

Student Supervision

Name	Position	Dates of supervision
Raveen Tehara	NSERC USRA	Summers 2021 and 2022
Pranali Sohoni	Mitacs Globalink & Honours Thesis	Summer & Fall 2021
Matthew Alexander	Ph.D. student	2020–present
Arnaud Ngopnang Ngompe	Ph.D. student	2020–present
Nimanthi Yaseema	M.Sc. student	2020–present
Michael Opadotun	M.Sc.	2019–2021

University Service

Event organization

Co-organizer of 7 conferences in topology and homotopy theory since 2013.

Co-organizer of the Prairie Mathematics Colloquium, 2019–present.

Organizer of the University of Regina Math & Stats Colloquium, 2019–present.

Organizer of the University of Regina Topology Seminar, 2018–present.

Organizer of the Homotopy Theory Topics Seminar, Western Ontario, 2013–2015.

Committee work and academic service

Member of the Ph.D. Committee of the Faculty of Graduate Studies and Research, 2022–present.

External examiner for one graduate student, 2021.

Co-instructor of the Putnam training sessions, Regina, Fall 2020–2022.

NSERC Scholarships and Fellowships Selection Committee for Mathematical Sciences, 2019–2022.

Member of the thesis committee for four graduate students, Regina, 2019–2021.

Member of the Ph.D. commission for two graduate students, Osnabrück, 2016.

Refereeing

Referee for the NSERC Discovery Grant program, 2021.

Reviewer for MathSciNet, 2015–present.

Reviewer for Zentralblatt MATH, 2011–2018.

Referee for 11 academic journals.

Referee for the Shota Rustaveli National Science Foundation of Georgia, 2011–2018.

Scholarly Research

M. Frankland and M. Spitzweck. Towards the dual motivic Steenrod algebra in positive characteristic. Accepted in Mathematische Zeitschrift.

J.D. Christensen and M. Frankland. On good morphisms of exact triangles. J. Pure Appl. Algebra 226 (2022), no. 3, Paper no. 106846.

H.J. Baues and M. Frankland. The DG-category of secondary cohomology operations. Appl. Categ. Structures 28 (2020), no. 6, 877–905.

H.J. Baues and M. Frankland. Eilenberg–MacLane mapping algebras and higher distributivity up to homotopy. New York J. Math. 23 (2017), 1539–1580.

J.D. Christensen and M. Frankland. Higher Toda brackets and the Adams spectral sequence in triangulated categories. Algebr. Geom. Topol. 17-5 (2017), 2687–2735.

H.J. Baues and M. Frankland. 2-track algebras and the Adams spectral sequence. J. Homotopy Relat. Struct. 11 (2016), no. 4, 679–713.

T. Barthel and M. Frankland. Completed power operations for Morava E-theory. Algebr. Geom. Topol. 15-4 (2015), 2065–2131.

M. Frankland. Behavior of Quillen (co)homology with respect to adjunctions. Homology Homotopy Appl. 17 (2015), no. 1, 67–109.

H.J. Baues and M. Frankland. The realizability of operations on homotopy groups concentrated in two degrees. J. Homotopy Relat. Struct. 10 (2015), no. 4, 843–873.

Chun-Hua Guo

Professor

chun-hua.guo@uregina.ca, (306) 585 4423

Education and Professional Development

September 1995 - April 1998: Ph. D. in Mathematics, University of Calgary, Canada

September 1986 - June 1989: M. Sc. in Mathematics, Zhejiang University, China

September 1979 - July 1983: B. Sc. in Mathematics, Nankai University, China

Employment History

July 2008 - : Professor, Department of Mathematics and Statistics, University of Regina

Teaching History

Calculus I, Calculus II, Vector Calculus, Calculus for the Social & Management Sciences, Linear Algebra I, Linear Algebra II, Introductory Mathematical Analysis, Methods of Numerical Analysis, Numerical Analysis I
Numerical Analysis (graduate course), Matrix Analysis (graduate course)

Student Supervision

Name	Position	Dates of supervision
Bo Yu	Post-doctoral fellow	March 2013 - August 2013
Vijayaparvathy Agasthian	Ph.D. student	September 2009 - April 2015
Christos Chorianopoulos	Post-doctoral fellow	July 2014 - June 2015
Di Lu	M.Sc. student	September 2013 - December 2015
Anupam Roy	M.Sc. student	September 2014 - January 2017
Di Lu	Ph.D. student	January 2016 - December 2021
Sammai Toha	M.Sc. student	September 2022 -

University Service

Member of Council Discipline Committee, University of Regina, July 2012 - June 2015

Member of the NSERC USRA Scholarship Selection Committee, University of Regina, 2014, 2021

Member of Scholarship Committee, Faculty of Science, November 2013 - June 2021

Member of Student Appeals Committee, Faculty of Science, July 2012 - June 2018

Member of Committee on Graduate Studies, Department of Mathematics and Statistics, July 2017 - June 2019
Member of Committee on Research, Department of Mathematics and Statistics, July 2012 - June 2017, July 2019 -

Scholarly Research

Publications in Refereed Journals:

C.-H. Guo, Y.-C. Kuo, and W.-W. Lin, On a nonlinear matrix equation arising in nano research, SIAM Journal on Matrix Analysis and Applications, 33 (2012), pp. 235-262.

C.-H. Guo, Y.-C. Kuo, and W.-W. Lin, Numerical solution of nonlinear matrix equations arising from Green's function calculations in nano research, Journal of Computational and Applied Mathematics, 236 (2012), pp. 4166-4180.

C.-H. Guo, Iterative methods for a linearly perturbed algebraic matrix Riccati equation arising in stochastic control, Numerical Functional Analysis and Optimization, 34 (2013), pp. 516-529.

C.-H. Guo, Monotone convergence of Newton-like methods for *M*-matrix algebraic Riccati equations, Numerical Algorithms, 64 (2013), pp. 295-309.

C.-H. Guo, On algebraic Riccati equations associated with *M*-matrices, Linear Algebra and its Applications, 439 (2013), pp. 2800-2814.

C.-H. Guo, C. Liu, and J. Xue, Performance enhancement of doubling algorithms for a class of complex nonsymmetric algebraic Riccati equations, IMA Journal of Numerical Analysis, 35 (2015), pp. 270-288.

C.-H. Guo and B. Yu, A convergence result for matrix Riccati differential equations associated with *M*-matrices, Taiwanese Journal of Mathematics, 19 (2015), pp. 77-89.

C.-H. Guo and D. Lu, On algebraic Riccati equations associated with regular singular *M*-matrices, Linear Algebra and its Applications, 493 (2016), pp. 108-119.

C.-S. Liu, C.-H. Guo, and W.-W. Lin, A positivity preserving inverse iteration for finding the Perron pair of an irreducible nonnegative third order tensor, SIAM Journal on Matrix Analysis and Applications, 37 (2016), pp. 911-932

C. Chorianopoulos and C.-H. Guo, Numerical range for the matrix exponential function, Electronic Journal of Linear Algebra, 13 (2016), pp. 633-645.

C.-S. Liu, C.-H. Guo, and W.-W. Lin, Newton-Noda iteration for finding the Perron pair of a weakly irreducible nonnegative tensor, Numerische Mathematik, 137 (2017), pp. 63-90.

D. Lu and C.-H. Guo, Monotonicity and positivity of coefficients of power series expansions associated with Newton and Halley methods for the matrix *p*th root, Linear Algebra and its Applications, 556 (2018), pp. 131-143.

C.-H. Guo, W.-W. Lin, and C.-S. Liu, A modified Newton iteration for finding nonnegative *Z*-eigenpairs of a nonnegative tensor, Numerical Algorithms, 80 (2019), pp. 595-616.

C.-H. Guo, Explicit convergence regions of Newton's method and Chebyshev's method for the matrix *p*th root, Linear Algebra and its Applications, 583 (2019), pp. 63-76.

C.-H. Guo and D. Lu, A study of Schroder's method for the matrix *p*th root using power series expansions, Numerical Algorithms, 83 (2020), pp. 265-279.

D. Lu and C.-H. Guo, Explicit *p*-dependent convergence regions of Newton's method for the matrix *p*th root, Applied Mathematics Letters, 122 (2021), Paper No. 107566, 6 pp.

C.-H. Guo, W.-W. Lin, and C.-S. Liu, A new modified Newton iteration for computing nonnegative *Z*-eigenpairs of nonnegative tensors, Applied Mathematics Letters, 136 (2023), Paper No. 108454, 6 pp.

Allen Herman

Professor

Allen.Herman@uregina.ca, (306) 585 4487

Education and Professional Development

PhD 1995 (Alberta), MSc 1991 (Alberta), BEd 1988 (Lethbridge)

Employment History

Professor, Department of Mathematics and Statistics, University of Regina (2009-present)

Teaching History

Stat 100 Introduction to Statistics (201310,201410)
Math 423 Modern Algebra II/Math 823 Algebra (201330,201530)
Math 101 Introduction to Finite Mathematics (201530,201630, 201930)
Math 308 Topics in the History of Mathematics (201610,201810, 202110)
Math 424 Applied Algebra/Math 824 Topics in Algebra (201610, 201930)
Math 110 Calculus I (201630)
Math 321 Number Theory I (201710)
Math 323 Modern Algebra I (201710, 201810, 202010, 202110)
Math 103 Calculus for Business and Management Sciences I (201730)
Math 223 Introduction to Modern Algebra (201730, 202230)
Math 111 Calculus II (201830, 201910, 202030)
Math 217 Introduction to Differential Equations (201830)
Math 438/838 Associative Algebras, Groups, and Representation Theory (201910)
Math 301 Introduction to Mathematical Logic (202010)

Student Supervision

Name	Position	Dates of supervision
Gurmail Singh	PhD-co-sup	2011-2015
Mohammad Izadi	PhD-co-sup	2012-2016
Alyeah Alsairafi	PhD-co-sup	2015-2021
Momita Shau	PhD-co-sup	2016-2020
Roqayia Shalabi	PhD-co-sup	2017-2022
Thomas Stanley	BSc-co-sup	May-August 2017
Roghayeh Maleki	PhD-sup	2018-2022
Neha Joshi	PhD-co-sup (in progress)	2018-present
Abhay Sobhanan	BSc-sup	May-August 2018
Mehwish Mo. Anwar	BSc-sup	May-August 2018

University Service

University:

Council Committee on Academic Mission (member 2015-2016, chair 2016-2017),
Executive of Council (2018-2020)
Faculty of Education – Search Committee – Tenure Track Mathematics Education (member Fall 2015)
Faculty of Science ad hoc Cttee re: Article 30: Instructional and Information Technology (Fall 2016),
Faculty of Science Representative to Faculty of Engineering (2017-2021),
Department of Math and Stats – Graduate Studies and Research Committee (member 2015-2017),
Undergraduate Curriculum Committee (2017-2019), Research Committee (chair, 2020-present),
Search Committee – Tenure Track Algebraic Topology (2017-2018).

External:

Pacific Institute for the Mathematical Sciences – University of Regina Site Director (2020-present),
Co-organizer – PIMS Math to Power Industry Workshop (2020-present)
Department of Mathematics and Statistics, University of Winnipeg – External Reviewer (2018-2019)
2019 Canadian Mathematical Society Summer Meeting – Co-scientific Director (2018-2019)

Scholarly Research

Publications

Angelica Babei and Allen Herman, Calculating zeta functions of integral table algebras using local zeta integrals, *Mediterranean Journal of Mathematics*, to appear. (arXiv: [math.NT])(Accepted Oct 2022)

Allen Herman and Roghayeh Maleki, The search for small association schemes with noncyclotomic eigenvalues, *Ars Mathematica Contemporanea*, to appear. (arXiv:2110.07071 [math.CO])(Accepted Sept 2022)

Allen Herman, Neha Joshi, and Karen Meagher, Fusions of the generalized Hamming scheme on a strongly-regular graph, *Graphs and Combinatorics*, **38** (2022), 150 (34 pages) (arXiv:2202.01150 [math.CO])

Peter J. Cameron, Allen Herman, and Dimitri Leemans, String *C*-groups with real Schur index *2*, *Journal of Pure and Applied Algebra*, **226** (8), (2022), 107025. (arXiv:2201.01313v1 [math.GT])

Alyeah Alsairafi and Allen Herman, Symmetric association schemes arising from abstract regular polytopes, *Contributions to Discrete Mathematics*, **16** (1), (2021), 98-115. (Open access)

Allen Herman, Schur indices for noncommutative reality-based algebras with two nonreal elements, *Journal of Algebra and its Applications*, **20** (10), (2021), 2150177. (arXiv:1905.00445v3 [math.RA])

Allen Herman, A survey of semisimple *Q*-algebras in algebraic combinatorics, *Indian Journal of Pure and Applied Mathematics*, **52**, (2021), 631-642. (https://ourspace.uregina.ca/handle/10294/14449)

Allen Herman and Gurmail Singh, Extending table algebras to Hopf algebras, *International Electronic Journal of Algebra*, **26** (2019), 13-28. (Open access)

Fernando Szechtman, Momita Shau, and Allen Herman, Weil representations of unitary groups over ramified extensions of finite local rings of odd nilpotency length, *Communications in Algebra*, **47** (8), (2019), 3007-3024. (arXiv:1801.10268 [math.RT])

Thomas Guedenon and Allen Herman, A Brauer-Clifford-Long group for the category of dyslectic Hopf Yetter-Drinfel'd *(S,H)*-module algebras, *Theory and Applications of Categories*, **33** (9), (2018), 216-252. (Open access)

Allen Herman and Gurmail Singh, Orders of torsion units of integral reality-based algebras with rational multiplicities, *Journal of Algebra and its Applications*, **17** (1), (2018), 1850015 (12 pgs). (https://ourspace.uregina.ca/handle/10294/12316)

Andreas Bachle, Allen Herman, Alexander Konovalov, Leo Margolis, and Gurmail Singh, The status of the Zassenhaus conjecture for small groups, *Experimental Mathematics*, **27** (4), (2018), 431-436. (arXiv:1609.00042 [math.RA])

Allen Herman, Mikhail Muzychuk, and Bangteng Xu, Non-commutative reality-based algebras of rank 6, *Communications in Algebra*, **46** (1), (2017), 90-113. (arXiv:1608.08463 [math.RA])

Allen Herman, Mitsugu Hirasaka, and Semin Oh, Zeta fuctions for tensor products of coprime integral adjacency algebras of association schemes, *Communications in Algebra*, **45** (11), (2017), 4896-4905. (arXiv:1508.07287v2 [math:RA])

Allen Herman, Mikhail Muzychuk, and Bangteng Xu, The recognition problem for table algebras and reality-based algebras, *Journal of Algebra*, **479**, (2017), 173-191. (arXiv:1506.05476v2 [math.RA]) 31a. Corrigendum, *Journal of Algebra* **525** (2019), 589-590. (https://ourspace.uregina.ca/handle/10294/12317)

Fernando Szechtman, Allen Herman and Mohammad A. Izadi, Representations of McLain Groups, *Journal of Algebra*, **474** (2017), 288-328. (arXiv:1506.06184v12 [math.RT])

Allen Herman and Gurmail Singh, Central torsion units of integral reality-based algebras with a positive degree map, *International Electronic Journal of Algebra*, **21** (2017), 121-126. (Open access)

Allen Herman and Gurmail Singh, Revisiting the Zassenhaus Conjecture on torsion units for the integral group rings of small groups, *Proceedings. Mathematical Sciences. Indian Academy of Sciences*, **125** (2), (2015), 167-172.

Allen Herman and Gurmail Singh, Torsion units of integral *C*-algebras, *JP Journal of Algebra, Number Theory, and Applications*, **36** (2), (2015), 141-155.

Allen Herman and Gurmail Singh, On the Torsion Units of Integral Adjacency Algebras of Finite Association Schemes, *Algebra*, Vol. 2014, 2014, Article ID 842378, 5 pages. (Open Access)

James Cruikshank, Allen Herman, Rachael Quinlan, and Fernando Szechtman, Unitary groups over local rings, *Journal of Algebra and its Applications*, **13** (2), (2014), 1350093.

Allen Herman and Fernando Szechtman, The Weil representation of a unitary group associated to a ramified quadratic extension of a finite local ring, *Journal of Algebra*, **392** (2013), 158-184.

Thomas Guedenon and Allen Herman, The Brauer-Clifford group for *(S,H)*-Azumaya algebras over a commutative ring, *Algebras and Representation Theory*, **16** (1), (2013), 101-127.

Computer Programs for use in the Public Domain

wedderga 4.10.1: Wedderburn decomposition of group algebras, by G. Kaur Bakshi, O. Broche Cristo, A. Herman, A. Konovalov, S. Maheshwary, G. Olteanu, A. Olivieri, A. del Rio, I. van Gelder. Included as a package of **GAP 4.11.1** , released May 2020. (http://www.gap-system.org/Packages/wedderga.html)

Michael Kozdron

Associate Professor

michael.kozdron@uregina.ca, (306) 585-4885

Education and Professional Development

Visiting Fellow, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, January 2015 — June 2015.

Invited Research Visitor, Simons Center for Geometry and Physics, Stony Brook, NY, April 2013 — May 2013.

Research Member, Mathematical Sciences Research Institute, Berkeley, CA, January 2012 — May 2012.

Visiting Fellow, Mathematical Sciences Institute, Australian National University, January 2011 — May 2011.

Visiting Associate Professor, Department of Mathematics, University of British Columbia, August 2010 — December 2010.

Visiting Assistant Professor, Department of Mathematics, Cornell University, June 2006 — August 2006.

Ph.D., Department of Mathematics, Duke University, May 2004. Thesis: Simple Random Walk Excursion Measure in the Plane. Advisor: Prof. Gregory F. Lawler.

Employment History

Associate Professor, Department of Mathematics & Statistics, University of Regina, July 1, 2009 — present. Tenure and promotion granted July 1, 2009.

Teaching History

ACSC 456/STAT 456: Applied Stochastic Processes, Winter 2013, Winter 2016.

ACSC 300/STAT 300: Statistical Learning and Predictive Modeling, Winter 2019, Winter 2020.

CS 261/MATH 261: Methods of Numerical Analysis, Fall 2012.

MATH 819: Topics in Analysis (Probability on Graphs), Winter 2013.

MATH 411/810: Measure and Integration, Winter 2022.

MATH 317: Real Analysis I, Winter 2021.MATH 312: Complex Analysis I, Fall 2012, Fall 2013, Fall 2020.

MATH 300: Introduction to Set Theory, Fall 2019.

STAT 452/852: Advanced Statistical Inference, Winter 2019.

STAT 451/851: Probability, Fall 2013, Fall 2019, Fall 2020, Fall 2021.

STAT 441: Stochastic Calculus with Applications to Finance, Fall 2014.

STAT 362: Bayesian Statistics, Winter 2014.

STAT 354: Linear Statistical Methods, Fall 2018.

STAT 351: Intermediate Probability, Fall 2015, Fall 2016.

STAT 252: Mathematical Statistics, Winter 2016, Winter 2022.

STAT 251: Introduction to Probability, Fall 2015.

STAT 160: Introductory Statistics, Fall 2016, Winter 2020, Fall 2020, Fall 2021.

Student Supervision

Name	Position	Dates *of supervision*
Jason Susanna Anquandah	M.Sc., African Institute for Mathematical Sciences, Tanzania	May 2015 — August 2015
Kyler Johnson	M.Sc., University of Regina	Sept. 2012 — May 2014
Kian Blanchette	NSERC USRA, U of R	May 2017 — August 2017
Joseph Ashworth	B.Sc., summer research, U of R	May 2016 — August 2016
Kian Blanchette	B.Sc., summer research, U of R	May 2016 — August 2016
Riley Peters	B.Sc., summer research, U of R	May 2016 — August 2016
Brayden Tang	B.Sc., summer research, U of R	May 2016 — August 2016
Larissa Richards	NSERC USRA, U of R	May 2013 — August 2013
Daniel Palmarin	NSERC USRA, U of R	May 2013 — August 2013
Larissa Richards	B.Sc., Honours Thesis, U of R	Sept. 2012 — April 2013
Daniel Palmarin	NSERC USRA, U of R	May 2012 — August 2012
Larissa Richards	NSERC USRA, U of R	May 2012 — August 2012

University Service

Ph.D. External Examiner, Monash University, July 2021.

M.Sc.. External Examiner, Australia National University, June 2020.

Ph.D. External Examiner, Australia National University, June 2014.

M. Eng. External Examiner, University of Regina, March 2013.

Regina Science Fair, Judge, 2012 — present.

URFA, Academic Staff, Chief Negotiator, 2014 — 2017 contract.

URFA, Academic Staff, Chief Negotiator, 2017 — 2021 contract.

URFA, APT, Chief Negotiator, 2017 — 2021 contract.

Journal Referee: J Stat Phys, Appl Math E-Notes, New J Phys, Math Mag, Comm Math Phys, J Phys A, J Math Anal Appl, Math Nachr, J Europ Math Soc, Ann IHP, Duke Math J, J Math Chem, Electron J Probab, Physica A.

Various University-wide, Faculty, and Departmental committees.

Many invited lectures at domestic and international conferences.

Scholarly Research

(with Kyler S Johnson) On a quantum martingale convergence theorem, Int. J. Quantum Inf., DOI: 10.1142/S0219749922500289, 2022. (To appear.)

(with Douglas Farenick and Sarah Plosker) Spectra and variance of quantum random variables. J. Math. Anal. Appl., 434:1106-1122, 2016.

(with Tom Alberts and Robert Masson) Some partial results on the convergence of loop-erased random walk to SLE(2) in the natural parametrization. J. Statist. Phys., 153:119-141, 2013.

(with Christian Beneš and Fredrik Johansson Viklund) On the rate of convergence of loop-erased random walk to SLE_2. Commun. Math. Phys., 318:307-354, 2013.

(with Tom Alberts and Gregory F. Lawler) The Green function for the radial Schramm-Loewner evolution. J. Phys. A: Math. Theor., 45:494015, 2012.

(with Douglas Farenick) Conditional expectation and Bayes' rule for quantum random variables and positive operator valued measures. J. Math. Phys., 53:042201, 2012.

Patrick Maidorn

Instructor III

patrick.maidorn@uregina.ca, (306) 585 4013,

Education and Professional Development

1997 Bachelor of Education Althouse College, University of Western Ontario, London.
1996 Master of Mathematics Applied Mathematics, University of Waterloo, Waterloo.
1994 Bachelor of Science (Mathematics) University of Guelph, Guelph.

Employment History

1997-present Instructor, University of Regina, Regina.

Teaching History

Math 101 (Introductory Finite Mathematics I): Fall 2017, Fall 2018
Math 102 (Mathematical Modeling and PreCalculus): Fall 2012, Fall 2013, Winter 2014, Fall 2014, Winter 2015, Fall 2015, Winter 2016, Fall 2017, Fall 2018, Fall 2019, Fall 2020, Winter 2021, Fall 2021, Winter 2022, Fall 2022
Math 103 (Applied Calculus I): Winter 2015, Winter 2021, Fall 2021, Winter 2022, Fall 2022
Math 110 (Calculus I): Fall 2014, Fall 2015, Fall 2020
Math 111 (Calculus II): Fall 2019
Math 112 (Applied Calculus II): Fall 2018, Fall 2019, Fall 2020
Math 124 (The Art and Science of Secret Writing): Winter 2013, Winter 2016, Winter 2019, Winter 2020
Math 213 (Vector Calculus): Winter 2014
Math 217 (Differential Equations I): Winter 2013
Stat 100 (Elementary Statistics for Applications): Winter 2013, Fall 2013, Winter 2014, Fall 2014, Fall 2015, Fall 2017, Fall 2019, Winter 2022
Stat 160 (Introductory Statistics): Fall 2012, Fall 2013, Winter 2016, Winter 2018

University Service

UNIVERSITY SERVICE

03/20-09/20	Online Teaching Task Force, Mathematics and Statistics, Member
07/17-present	Undergraduate Coordinator, Mathematics and Statistics
07/17-present	Committee on Undergraduate Studies, Mathematics and Statistics, Chair
07/17-present	Admissions and Studies, Faculty of Science, Math & Stats representative
07/16-present	Outreach Working Group, Mathematics and Statistics, Chair until 06/21
09/00-present	Pre-Calculus Sessions, Dept. Of Math and Stats, organizer and facilitator
07/07-06/16	Nominating Committee, Faculty of Science, Member
05/15	Dept. of Mathematics and Statistics Instructor Search Committee, Chair
07/11-06/14	Undergraduate Curriculum Committee, Math and Stats, Member
07/10-06/13	Centre for Continuing Education, Faculty of Science Representative

OUTREACH AND COMMUNITY SERVICE

10/20	Math Circle Program at Regina Public Library, Albert Branch.
09/03 - 03/20	Math Circle and Problem Solving Workshops for students in Grades 1-12, Organizer and facilitator of bi-weekly session in Fall/Winter.
03/14 - 03/20	Canadian Math Kangaroo Contest, organizer of local contest at the University of Regina, as well as the local award ceremonies.
03/15 - present	Mathematics Enrichment Camp for Grade 1-12, University of Regina, Organizer.
11/16 - present	Canadian Math Kangaroo, Member.
07/16 - present	PIMS Saskatchewan Education Coordinator.
07/16 - present	Canadian Mathematical Society, Math Camps Subcommittee Member.
06/07 - present	PIMS Pi in the Sky, Editorial Board Member.
04/98- present	Judge at Regional Science Fair (various years).
07/17	Canada Wide Science Fair, co-facilitator of “UR a scientist” session.
07/10-07/16	Mother Theresa Middle School Science Camp, University of Regina, Session facilitator.
09/13-05/15	Math Club, Ecole Massey School, Regina, Organizer.
03/13	Saskatchewan Mathematics Challenge, Co-Organizer and Exam Writer.

Augustin-Liviu Mare

Associate Professor

augustin.mare@uregina.ca, (306) 585 4884,

Education and Professional Development

Ph.D., June 1998, University of Augsburg, Germany, Mathematics

Employment History

Associate Professor, Department of Mathematics and Statistics, University of Regina

Teaching History

MATH 101-Introductory Finite Mathematics I (French), MATH 103-Applied Calculus I,

MATH 217-Differential Equations I, MATH 231-Euclidean Geometry,

MATH 331-Non-Euclidean Geometry, MATH 401-Matrix Groups,

MATH 431-Differential Geometry I, MATH 831-Differential Geometry,

MATH 890 AI-Lie Groups, STAT 100-Elementary Statistics for Applications (French)

University Service

Committee on Undergraduate Studies (member, organizer of the Honours Seminar)
Science Student Appeal Committee (member)
Faculty of Science representative to the Centre of Continuing Education Council.
Liberal Arts Advisory Group to the U of R President (member)
Student and Faculty Engagement Working Group (member)
PIMS Steering Committee (member)
Faculty of Science representative to La Cité Universitaire
Department Committee on Research (member)
Department Committee on Graduate Studies (member)

Scholarly Research

(with J. Carlson, C. He, and O. Goertsches),*The equivariant cohomology ring of a cohomogeneity-one action*, Geom. Dedicata **203** (2019), 205-223

(with S. Hagh Shenas Noshari and O. Goertsches) *On the equivariant cohomology of hyperpolar actions on symmetric spaces*, Documenta Math. **24** (2019), 1657-1676

(with L. Mihalcea) *An affine deformation of the quantum cohomology ring of flag manifolds and periodic Toda lattices*, Proc. Lond. Math. Soc. **116** (2018), 135-181

(with O. Goertsches) *Assignments for topological group actions*, Indag. Math. **28** (2017), 1210-1232

(with O. Goertsches) *Equivariant cohomology of cohomogeneity one actions: The topological case*, Topology Appl **218** (2017), 93-96

On the complete integrability of the periodic quantum Toda lattice, Forum Math. **29** (2017), 1413-1428

(with O. Goertsches) *Non-abelian GKM theory,* Math.Z. **277** (2014), 1-27

(with O. Goertsches) *Equivariant cohomology of cohomogeneity one actions*, Topology Appl. **167** (2014), 36-52

(with M. Willems*) Topology of the octonionic flag manifold,* Munster J.~Math. **6** (2013), 483-523

Richard McIntosh

Professor of Mathematics

Richard.Mcintosh@uregina.ca, (306) 585-4345

Education and Professional Development

Ph.D. Pure Mathematics University of California Los Angeles 1989

Teaching History

Math 103, Math 110, Math 111, Math 112, Math 213, Math 217, Math 221, Math/CS 261, Math 313, Math 321, Math 421, Math 821, Stat 100, Stat 160, Stat 289.

Student Supervision

Name	Position	Dates of supervision
Dipra Mitra	Postdoctorial Appointment	2014

University Service

Served on the supervisory committee for the Ph.D. thesis defence for Roqayia Shalabi, Department of Mathematics and Statistics, University of Regina, 2022. Thesis title: The Schurian association schemes associated with parabolic subgroups of Coxeter groups.

Served on the supervisory committee for the Ph.D. thesis defence for Alyeah Alsaira_, Department of Mathematics and Statistics, University of Regina, 2020. Thesis title: Schurian association schemes arising from abstract regular polytopes.

Served as an external examiner for M.Sc. thesis defence for Abdulrahman Mukadam, Department of Chemistry, University of Regina, 2020. Thesis title: Ethylenediamine: Modelling of its conformers and its chelating ability with zinc (II) complexes in aqueous solution.

Served with Ed Doolittle and Martin Frankland on the Putnam Committee 2021-2022.

Mathematics Representative on the Faculty of Engineering & Applied Science Council 2011-21.

Helped Patrick Maidorn with the mathematics worshop for student grades 7 to 12,

2007-16.

Refereed publications for the following journals: Acta Arithmetica, American Mathematical Monthly, Crelle's Journal, Crux Mathematicorum, Discrete Mathematics, Discussiones Mathematicae { Algebra and Stochastic Methods, Mathematics of Computation, The Fibonacci Quarterly, The Ramanujan Journal.

Treasurer for the Knights of Columbus Campion College Council #15955, 2014-16.

Member of the Conservative Party Wascana Board of Directors 2012-16.

Contributor to Campion College Catholic Community, Souls Harbour Mission, and the Christian Children's Fund of Canada.

Scholarly Research

Most of my research is in the area of basic hypergeometric functions, theta functions and Ramanujan's mock theta functions. I discovered a method for obtaining the complete asymptotic expansion of a general class of q-series and used it to find new mock theta functions, including a new order (8th) of mock theta functions. Older asymptotic methods give at most two or three terms in the asymptotic expansion of q-series. My method is reproduced in Bruce Berndt's book on Ramanujan's Notebooks (Part IV). I have also worked on polynomially recursive functions, Franel integrals, and dilogarithm identities. My second area of research is computational number theory, in particular, congruences identifying the primes, the search for Fibonacci-Wieferich, Wilson and Wolstenholme primes and for factors of Fermat numbers.

Publications:

Congruences involving Euler numbers and power sums, Fibonacci Quart. 58 (2020), no. 4, 328-333.

New mock theta conjectures part I, Ramanujan J. 46 (2018), no. 2, 593-604.

On the asymptotics of some partial theta functions, Ramanujan J. 45 (2018), no. 3, 895-907.

Some identities for Appell-Lerch sums and a universal mock theta function, Ramanujan J. 45 (2018), no. 3, 767-779.

On the universal mock theta function g2 and Zwegers' _-function, Analytic Number Theory, Modular Forms and q-Hypergeometric Series, 497{502, Springer Proc. Math. Stat., 221, Springer, Cham, 2017.

Carmichael numbers with (p + 1)|(n + 1), with Dipra Mitra, J. Number Theory 147 (2015) 81-91.

Carmichael numbers with (p + 1)|(n - 1), Integers 14 (2014), Paper No. A59, 9 pp.

A survey of classical mock theta functions, with Basil Gordon, Partitions, q-series, and modular forms, 95{144, Dev. Math. 23, Springer, New York, 2012.

The H and K family of mock theta functions, Canad. J. Math. 64 (2012), no. 4, 935-960.

Conference Presentations:

“Fixing old formulas for computing pi," Pi Day presentation, University of Regina, March 14, 2017.

“On the Fermat, Lucas and Baillie-PSW probabilistic primality tests," Colloquium, University of Regina, January 27, 2017.

“A relation between the universal mock theta function g2 and Zweger's _-function," International Conference on Number Theory in honor of Krishna Alladi's 60th birth-day, University of Florida, Gainesville 2016.

“Diophantine equations associated with Baillie-PSW pseudoprimes," West Coast Number Theory Conference, Asilomar, California 2012.

“p-adic equations for power sums," Canadian Mathematical Society Summer Meeting, Regina, Saskatchewan 2012.

James Hugh McVittie

Assistant Professor

james.mcvittie@uregina.ca, (306) 585 5080,

Education and Professional Development

Ph.D in Statistics, McGill University, 2017-2022
Advisors: David Wolfson, McGill University
David Stephens, McGill University
Thesis: *Leveraging data structure in modelling procedures for time-to-event studies*

Master of Science in Statistics, McGill University, 2015-2017
Advisors: David Wolfson, McGill University
David Stephens, McGill University
Thesis: *Analysis of Left-Truncated Right-Censored Survival Data with Uncertainty of Onset Times*

Honours Bachelor of Science, University of Toronto, 2010-2015
Double Major in Mathematics and Statistics

Associate of The Royal Conservatory of Music (ARCT), The Royal Conservatory of Music, 2013
Piano Performance, Certificate in History and Theory: Advanced

Employment History

Assistant Professor, Department of Mathematics and Statistics
University of Regina, July 1, 2022-present

Research Trainee
Project Title: The Canadian Longitudinal Study on Aging as a vehicle for population neuroscience
McGill University Health Centre, 2020-2021

Sessional Instructor, Department of Mathematics and Statistics
McGill University, 2019-2021

Teaching Assistant, Department of Mathematics and Statistics
McGill University, 2015-2020

Graduate Student Grader, Department of Mathematics and Statistics
McGill University, 2016-2020

Teaching History

University of Regina
STAT160 (Introductory Statistics)
Fall 2022

McGill University
MATH682 (Statistical Inference)
Fall 2019, Fall 2020, Fall 2021

Student Supervision

Name	Position	Dates of supervision
Etienne Sebag	MSc. Mathematics and Statistics Student – University of Helsinki	Winter 2022 (undergraduate directed reading program)

University Service

Thesis Defense Chair, University of Regina.
Mr. Derek Mensah, Thesis: Assessment of Waste Management System Efficiencies and Waste Business Characteristics of Canadian Provinces, 2022.
Mr. Kenneth Adusei, Thesis: Modeling of Municipal Waste Disposal Behaviors Related to Meteorological and Astronomical Seasons using Recurrent Neural Network Models, 2022.

Committee Member 2022-2024, Committee on Research, Department of Mathematics and Statistics, University of Regina.

Member 2022-2023, Statistical Consulting Group, Department of Mathematics and Statistics, University of Regina.

Member 2022-2023, Student and Faculty Engagement Working Group, Department of Mathematics and Statistics, University of Regina.

Committee Member 2019-2022, Department of Mathematics and Statistics Computing Committee, McGill University.

Committee Member 2017-2019, Graduate Student Association of Mathematics and Statistics, McGill University, Vice-President Finance and Operations.

Scholarly Research

- **J.H. McVittie**, M. Asgharian. Testing equality of survival medians using length-biased right-censored observations. *accepted in Statistical Methods in Medical Research.*
- **J.H. McVittie**, D.B. Wolfson, D.A. Stephens. A note on the partial likelihood estimator of the proportional hazards model for combined incident and prevalent cohort data. *accepted in Metrika.*
- **J.H. McVittie**, A.F Best, D.B. Wolfson, D.A. Stephens, J. Wolfson, D.L. Buckeridge, S.M. Gadalla. Survival modelling for data from combined cohorts: Opening the door to meta survival analyses and survival analysis using electronic health records. *accepted in International Statistical Review.*
- **J.H. McVittie**, D.B. Wolfson, V. Addona, Z. Li. (2022) Stacked survival models for residual lifetime data. *BMC Medical Research Methodology*, 22(10).
- **J.H. McVittie**, V. Addona. (2021) A risk set adjustment for proportional hazards modelling of combined cohort data. *Journal of Applied Statistics*, 49(11): 2913-2927.
- **J.H. McVittie**, D.B. Wolfson, D.A. Stephens, V. Addona, D.L. Buckeridge (2020) Parametric models for combined failure time data from an incident cohort study and a prevalent cohort study. *International Journal of Biostatistics*, 17(2): 283-293.
- **J.H. McVittie**, D.B. Wolfson, D.A Stephens (2020) A note on the applicability of the standard non-parametric maximum likelihood estimator for combined incident and prevalent cohort data. *Stat*, 9(1).
- **J.H. McVittie**, D.B. Wolfson, D.A. Stephens (2019) Parametric modelling of prevalent cohort data with uncertainty in the measurement of the initial onset date. *Lifetime Data Analysis,* 26(2): 389-401.
- **J.H. McVittie** (2017) Absence of non-commutative matrix obsrvables for q-state Potts models. *Mathematical Reports of the Academy of Science*, 39(1): 36-44.
- M.Freeman, **J.H. McVittie**, I. Sivak, J. Wu (2014) Viral information propagation in the Digg online social network. *Physica A*, 415: 87-94.

- A. Alinas, T. Duchesne, E. Lavoie-Charland, M. Malekiha, **J.H. McVittie**, I. Saidani, A. Sen, J. Wang, M. Zhao (2016) Event variables in client analytics: Project Submitted by The Co-Operators. 17. *Centre de Recherches Mathematiques.*

- **J.H. McVittie** (2017) doubcens – CRAN R Package: Survivor function estimation for doubly interval-censored failure time data.

Karen Meagher

Professor

karen.meagher@uregina.ca, (306) 585 4886,

Education and Professional Development

PhD MATHEMATICS, University of Ottawa May/02 – Sept./05

M.Math PURE MATHEMATICS, University of Waterloo Sept./95 – May/97

B.Sc. Honours MATHEMATICS, University of Alberta Sept./91 – Apr./95

Employment History

Professor, Dept. of Mathematics and Statistics, July 1, 2017 - present.
Acting Associate Dean, FGSR, Jan 1, 2017 – June 30, 2018.
Associate Professor, Dept. of Mathematics and Statistics, July 1, 2011 – June 30, 2017.
Assistant Professor, Dept. of Mathematics and Statistics, July 1, 2007 – June 30, 2011.

Teaching History

2022: Math 223, Math 427/827
2021: Math 327
2020: Math 223, Math 327, Math 827
2019: Math 329, Math 103, Math 827
2018: Math 327, Math 427/827
2016: Math 112 Math 103, Math 223, Math 498
2015: Math 327, Math 103
2014: Math 122, Math 110
2013: Math 127, Math 427/827, Math 327
2012: Math 127, Math 223, Math 221

Student Supervision

Name	Position	Dates of supervision
Raghu Tej Venkata Pantangi	PDF	08/22-present
Rachel Evans	M.Sc.	01/22-present
Neha Joshi	Ph.D.	09/18 - present
Mahsa Shirazi	Ph.D.	01/18 - 03/22
Sarobidy Razafimahatratra	Ph.D.	09/18 - 03/22
Cody Antal	B.Sc.	04/21–08/21
Bennett Eideness	B.Sc.	04/20–08/20
Dan Palmarin	M.Sc.	06/18–12/20
Ferdinand Ihringer	PDF	07/16–07/17

Adam Gorr	M.Sc.	07/16–05/17
Sam Jaques	B.Sc.	04/2016–08/2016
Alison Purdy	Ph.D.	09/10- 08/14
Adam Dyck	B.Sc.	04/2013–08/2013, 04/2014–08/2014
Bahman Ahmadi	Ph.D.	09/09–07/13
Fatemeh Alinaghipour	Ph.D.	04/10–07/13

University Service

Member and co-chair NSERC Mathematics and Statistics Evaluation Group (2019-2022)

Member of the following University Committees: Math and Stat Graduate Studies Committee, Chair (2018-present); Math and Stat Undergraduate Studies Committee (2013-2016); Member of the Faculty Review Committee (2015 - 2016); Faculty of Science Associate Dean Reappointment Advisory Committee; Hiring committees in Math&Stats, Biology, Computer Science, Research Office and Physics.

Member of the Following EDI Committee: Canadian Math Society Women in Math Committee - Chair (2019- present); Pacific Institute for the Mathematical Sciences EDI Commitee (2021-present); University of Regina Women in Science and Engineering group (2008-present).

Co-organizer for the following events: 2022 Careers in Math Workshop; 2022 Prairie Discrete Math Workshop; 2021 Connecting Women in Math across Canada; Scientific Director for Canadian Math Society 2019 Summer Meeting; 2017 Prairie Discrete Math Workshop; Emerging Mathematics Teachers Workshop at the University of Manitoba; A Conference to celebrate the work of Chris Godsil.

Other Activities: Main organizer for the University of Regina's Discrete Math Research Group; Referee for many journal and external review for grants; Member of the Canadian Discrete and Algorithmic Mathematics Conference Executive committee.

Scholarly Research

Karen Meagher, Mahsa Shirazi, Brett Stevens. An Extension of the Erdos-Ko-Rado Theorem to uniform set partitions. To appear *Ars Mathematica Contemporanea*. Oct. 2022.

Karen Meagher and A.S. Razafimahatratra. On the Intersection Density of the Kneser K(n,3). to appear *Eur. J. Comb.* Aug. 2022.

K. Meagher and A.S. Razafimahatratra. Erdos-Ko-Rado results for the general linear group, the special linear group and the affine general linear group. *The Art of Discrete and Applied Mathematics*. Oct. 2022

Allen Herman, Neha Joshi, Karen Meagher. Fusions of the generalized Hamming scheme on a strongly-regular graph. *Graphs and Combinatorics.* 38, Article number: 150 (2022) 28 pp

Karen Meagher, A.Sarobidy Razafimahatratra, The Erdo s-Ko-Rado theorem for 2-pointwise and 2-setwise intersecting permutations. *Electron. J. Combin.* 28 (2021), no. 4, Paper No. 4.10, 21 pp.

Shaun Fallat, Karen Meagher, Mahsa N. Shirazi. The Erdő s-Ko-Rado theorem for 2-intersecting families of perfect matchings.*Algebraic Combinatorics* (2021), no. 4, 575–598.

Karen Meagher, Andriaherimanana Sarobidy Razafimahatratra, Pablo Spiga. On triangles in derangement graphs. *J. Combin. Theory Ser. A* 180 (2021), Paper No. 105390, 26 pp.

K. Almuhtaseb, S. Fallat, K. Meagher, S. Nasserasr, M. N.Shirazi, A. S. Razafimahatratra. Weakly Hadamard Diagonalizable Graphs. *Linear Algebra and Its Applications* 610, (2021), 86–119.

K. Meagher and P. Sin. All 2-transitive groups have the EKR-module property. *JCTA*. 177 (2021), 21 pp.

J.Kokkala, K.Meagher, R.Naserasr, K.Nurmela, P.Ö stergard, B.Stevens.Bounds, structure, and classification of small strength-2 covering arrays. Journal of Combinatorial Designs. 28(1), (2020) 5–24.

Joseph S. Alameda, Franklin Kenter, Karen Meagher, Michael Young. An upper bound for the k-power domination number in r-uniform hypergraphs. Submitted to *Discrete Mathematics*. April 2020.

M. Adm, S. Fallat, K. Meagher, S. Nasserasr, S. Plosker, B. Yang. Achievable multiplicity partitions in the inverse eigenvalue problem of a graph. *Special Matrices* 7 (2019) 276–290

Susanna Fishel, Glenn Hurlbert, Vikram Kamat and Karen Meagher. Erdő s-Ko-Rado theorems on the weak Bruhat lattice. *Discrete Applied Mathematics* 266 (2019) 65–75

K. Meagher, An Erdos-Ko-Rado-type theorem for PSU3(q) *Designs, Codes, and Crypt.* 87:4 (2019) 717-744.

Aras Erzurumluoğ lu, Karen Meagher, and David A. Pike. Brushing Number and Zero-Forcing Number of Graphs and their Line Graphs. *Graphs and Combinatorics.* 34:6 (2018) 1279–1294.

M. Adm, R. Bergen, F. Ihringher, S. Jaques, K. Meagher, A. Purdy, B. Yang. Ovoids of generalized quadrangles of order (q, q2 − q) and Delsarte cocliques in related strongly-regular graphs. *J. of Comb. Designs*, 26:5(2018) 249–263

Ryan Bergen, Shaun Fallat, Adam Gorr, Ferdinand Ihringer, Karen Meagher, Alison Purdy, Boting Yang and Guanglong Yu. Infection in Hypergraphs. *Discrete Applied Mathematics* 237 (2018) 43–56.

Ferdinand Ihringer and Karen Meagher. Manickam-Miklo s-Singhi Conjectures on Par- tial Geometries. *De. Codes Cryptogr.* 86:6 (2018) 1311–1327.

ShaunFallat, Karen Meagher, Abolghasem Soltaniand, BotingYang. Compressed Cliques Graphs, Clique Coverings and Positive Zero Forcing. *Theoretical Computer Science*, 734 (2018) 119–130.

Chris Godsil and Karen Meagher. An algebraic proof of the Erdő s-Ko-Rado theorem for intersecting families of perfect matchings. *Ars Mathematica Contemporanea*, 12, (2017) 205–217.

Chris Godsil and Karen Meagher. Erdő s-Ko-Rado Theorems: Algebraic Approaches. Cambridge University Press, 2016, 350 pages.

Karen Meagher, Pablo Spiga and Pham Huu Tiep. An Erdő s-Ko-Rado theorem for finite 2-transitive groups. European J. Combin. 55, (2016) 100–118.

Peter Borg and Karen Meagher. The Katona cycle proof of the Erdő s-Ko-Rado theorem and its possibilities. J. Algebraic Combin. 43(4), (2016) 915–939.

Shaun Fallat, Karen Meagher and Boting Yang. On the Complexity of the Positive Semidefinite Zero Forcing Number. Linear Algebra and its Applications, 491:15 (2016) 101–122.

K. Meagher and A. Purdy. Intersection theorems for multisets. European J. of Combinatorics, 52, (2016) 120-135

P Borg and K Meagher. Intersecting generalised permutations. Australasian J. of Combinatorics. 61, (2015) 147–155

Bahman Ahmadi and KarenMeagher. The Erdő s-Ko-Rado property for some 2-transitive groups. Annals of Combinatorics. 19:4, (2015) 621–640.

Adam Dyck and Karen Meagher. An Erdő s-Ko-Rado theorem for subset partitions. Involve, a Journal of Mathematics 8:1 (2015) 119–127.

Bahman Ahmadi and Karen Meagher. The Erdő s-Ko-Rado property for some permutation groups. The Australasian Journal of Combinatorics. vol.61, (2015) p.23.

Donald Stanley

Professor

email.address@uregina.ca, (306) 585 4343,

Education and Professional Development

University of Toronto, Toronto, Ontario, Canada
1997 Doctorate in Mathematics (Ph.D.)
1990 Masters in Mathematics
University of Alberta, Edmonton, Alberta, Canada
1987 Bachelors in Applied Mathematics (Honors)

Employment History

June 2012- present Professor, University of Regina, Regina, Canada.

Teaching History

Math 110(5), Math 213 (4), Math221, Math 305, Math 313(2), Math 495AB, Math 803, Math 423/823, Math 420/820, Math 441/841(4), Math843,Math 849, Math 882, Math 890AP

Student Supervision

Name	Position	Dates of supervision
Liu Yong	PhD	Graduated 2016
Marzieh Bayeh	PhD	Graduated 2016
Wang Xiyuan	Masters	Graduated 2014
Hu Yang	Masters	Graduated 2017
Yihui Zhang	Masters	Graduated 2019
Kerry Cox	Masters	Graduated 2019

Masahiro Takeda	PhD (at Kyoto University)	Graduated 2022 (cosupervision)
Arnaud Ngopnang	PhD	Current (cosupervision)
Gabriel Valenzuela	Masters	Current
Baruch Sokaribo	Master	Current
Manak Singh	PhD	Current
Soumen Sarkar	PDF	2013-2015
Paul Arnaud Tsopmene	PDF	2016-2020
Larry So	PDF	2019-2022

University Service

PIMS Site director 2010-2016

Mathematics and Statistics Graduate coordinator 2015-2018

NSERC EG 2014-2017 (was Pure math chair and cochair)

PIMS CRG leader 2014-2018

Fields Program organizer 2020 Jan-June

URFA Grievance Committee Chair 2022

Campus Merit Committee 2022

Scholarly Research

H. Li, M. Olbermann and D. Stanley,
One-connectivity and finiteness of Hamiltonian S^1-manifolds with minimal fixed sets,
J. Lond. Math. Soc. (2) 92 (2015), 284–-310.

Donald Stanley, Adam-Christiaan van Roosmalen,
Derived equivalences for hereditary Artin algebras,
Advances in Mathematics 303 (2016), 415--463.

Pascal Lambrechts, Jeremy Lane, Donald Stanley,
An example using improved Lefschetz duality,
Chinese Annals of Mathematics, Series B. 38 (2017), 1269--1274.

Hector Cordova Bulens, Pascal Lambrechts, Donald Stanley,
Rational models of the complement of a subpolyhedron in a manifold with boundary,
Canadian Journal of Mathematics. 70 (2018), 265--293.

Paul Arnaud Songhafouo Tsopmene and Donald Stanley,
Polynomial functors in manifold calculus.
Topology and its Applications. 248 (2018), 75--116.

Hector Cordova Bulens, Pascal Lambrechts, Donald Stanley,
Pretty rational models for Poincaré duality pairs, Algebr. Geom. Topol. 19 (2019), 1--30.

Yong Liu, Donald Stanley, A classification of torsion classes in abelian categories, Comm. Algebra 47 (2019), 502--515.

Donald Stanley, Adam-Christiaan van Roosmalen,
t-structures on hereditary categories,
Math. Z. 293 (2019), 731--766.

Donald Stanley, Jeff Strom, Lusternik-Schnirelmann category of products with half-smashes. Algebr. Geom. Topol. 20 (2020), 439--450.

Michael Farber, Daisuke Kishimoto, Donald Stanley Generating functions and topological complexity. Topology Appl. 278 (2020), 107235, 5 pp.

Soumen Sarkar and Donald Stanley. Cohomology ring of a class of Torus manifolds
Trans. Moscow Math. Soc. (2020), 71--86.

Peter Bubenik, Jonathan Scott, and Donald Stanley. Exact weights, path metrics, and algebraic Wasserstein distances, to appear Journal of Applied and Computational Topology , 33 pages.

Larry So, Donald Stanley Realization of graded monomial ideal rings modulo torsion, to appear in Algebraic and Geometric Topology, 23 pages.

Fernando Szechtman

Professor

Fernando.Szechtman@uregina.ca, (306) 337-2339

Education and Professional Development

B.Sc. Universidad Caece, Buenos Aires, Argentina, 1992

M.Sc. University of Alberta, 1994

Ph.D. University of Alberta, 1999

Employment History

Associate Professor, University of Regina, 2008

Professor, University of Regina, 2019

Teaching History

Math 890/490 (Lie algebras and their representations)), Math 823/423 (Modules, Groups, and Galois Theory), Math 122 (Linear Algebra), Math 222 (Linear Algebra II), Math 422 (Linear Algebra IV), Math 323 (Abstact Algebra), Math 221 (Mathematical Reasoning), Math 101 (Mathematics for Teachers, Math 110 (Calculus I), Math 111 (Calculus II)

Student Supervision

Name	Position	Dates of supervision
Gustavo Krimker	M.Sc.	2009-2012
Martin Chaktoura	M.Sc.	2012-2014
Mohammad Izadi	Ph.D.	2012-2016
Ruhalla Ahmadi	P.D.F.	2014
Kyle Thompson	B.Sc.	2015
Ahmed Alkabary	B.Sc.	2015
Dipra Mitra	P.D.F.	2015
Moumita Shau	Ph.D.	2016-2019
Zachery Kish	B.Sc.	2019
Moumita Shau	P.D.F	2021
Alexander Montoya	M.Sc.	2021-

University Service

Department Committee on Graduate Studies (2009-2020); Department Committee Member in the thesis defense of numerous students; Graduate Coordinator (2018-2020), Department Committee on Research (2020-), Faculty of Graduate Studies and Research (Faculty Council), University of Regina, NSERC Selection Committee, Employee Engagement Survey (Faculty of Science Ambassador); Faculty Library Representative, Graduate Admissions and Studies Committee, Organizer of Chess Lecture and Chess Exhibition by Master Keith MacKinnon at the University of Regina (for students in grades 1 to 12), Organizer of Chess Tournament at the University of Regina (for students in grades 1 to 12); Helper for Math Club at the University of Regina (for students in grades 7 to 12), Helper for Math Camp at the University of Regina (for students in grades 5 to 10), Meeting with High School Teachers at Luther High School, Founding Member of Wise Math (advocacy group for quality of elementary and secondary education in Mathematics)

Scholarly Research (Selected papers published in the last 10 years)

N. Guersenzvaig and F. Szechtman, Roots multiplicity and square-free factorization of polynomials using companion matrices, Linear Algebra and its Applications, 436 (2012) 3160-3164;

L. Cagliero and F. Szechtman, The classification of uniserial $sl(2)\ltimes V(m)$-modules and a new interpretation of the Wigner-Racah 6j-symbol}, Journal of Algebra, 386 (2013) 142--175;

M. Chaktoura and F. Szechtman, A note on orthogonal Lie algebras in dimension 4 viewed as current Lie algebras, Journal of Lie Theory, 23 (2013) 1101--1103;

A. Herman and F. Szechtman, Weil representation of unitary groups associated to a ramified quadratic extension of a finite local ring, Journal of Algebra 392 (2013) 158-184;

M. Chaktoura and F. Szechtman, Compositio series of gl(m) as a module for its classical subalgebras over an arbitrary field, Journal of Lie Theory, 24 (2014) 225--258;

F. Szechtman,Equivalence and normal forms of bilinear forms, Lin Alg and its Appl, 443 (2014) 245--259;

L. Cagliero and F. Szechtman, On the theorem of the primitive element with applications to the representation theory of associative and Lie algebras, Canad. Mathematical Bulletin, 57 (2014) 735-748;

S.R. Ahmadi, M. Izadi and F. Szechtman, Lie algebras and bilinear forms in characteristic 2, Linear Algebra and its Applications, 448 (2014) 299--314;

F. Szechtman, Groups having a faithful irreducible representation, J of Algebra, 454 (2016) 292--307;

L. Cagliero, L. Gutierrez Frez and F. Szechtman, Classification of finite dimensional uniserial representations of conformal Galilei algebras, Journal of Mathematical Physics 57 (2016) 101706;

F. Szechtman, A. Herman, M. Izadi, Representations of McLain groups, J of Algebra, 474 (2017) 288--328;

F. Szechtman, Irreducible representations of unipotent subgroups of symplectic and unitary groups defined over rings, Journal of Group Theory, 20 (2017) 545--559;

P. Casati, A. Previtali and F. Szechtman, Indecomposable modules of solvable Lie algebras}, Linear Algebra and its Applications, 531 (2017) 423--446;

L. Cagliero and F. Szechtman, Jordan-Chevalley decomposition in Lie algebras, Canadian Mathematical Bulletin, 62 (2019) 349--354;

J. Cruichshank, R. Quinlan and F. Szechtman, Hermitian and skew hermitian forms over local rings, Linear Algebra and its Applications, 551 (2018) 147--161;

J. Cruickshank and F. Szechtman, Generators and relations for the unitary group of a skew hermitian form over a local ring, Linear Algebra and its Applications, 552 (2018) 1--28;

F. Szechtman, M. Shau and A. Herman, Weil representations of unitary groups over ramified extensions of finite local rings with odd nilpotency length, Communications in Algebra, 47 (2019) 3007--3024;

M. Shau and F. Szechtman, Clifford theory of Weil representations of unitary groups, Journal of Group Theory, 22 (2019) 975--999;

J. Cruickshank, L. Gutierrez Frez and F. Szechtman, Weil representations via abstract data and Heisenberg groups: a comparison, Journal of Algebra, 547 (2020) 129--161;

F. Szechtman, On the degree of repeated radical extensions, Canad Math Bulletin, 64 (2021) 877--885;

L. Cagliero, F. Levstein and F. Szechtman, Nilpotency degree of the nilradical of a solvable Lie algebra on two generators and uniserial modules of free nilpotent Lie algebras, J of Algebra, 585 (2021) 447--483;

R. Quinlan, M. Shau and F. Szechtman, Linear diophantine equations in several variables, Linear Algebra and its Applications, 640 (2022) 67—90.

Jan-Paul Venter

Assistant Professor

jan-paul.venter@uregina.ca, (306) 585 5522

Education and Professional Development

Fellow of the Actuarial Society of South Africa (FASSA)

Associate of the Canadian Institute of Actuaries (ACIA)

M.Sc. (Mathematical Statistics)

Employment History

2018-Present: Assistant Professor (University of Regina)

2014-2018: Independent Actuarial Consultant

2014-2018: Lecturer (University of the Free State)

2006-2014: Actuarial Analyst (OUTsurance)

Teaching History

University of Regina

ACSC116 (Mathematics of Finance I)

ACSC216 (Mathematics of Finance II)

ACSC316 (Mathematics of Finance III)

ACSC317 (Actuarial Models I)

ACSC417 (Introduction to Casualty Insurance and Credibility)

ACSC418/STAT818 (Time Series Analysis and Forecasting)

ACSC419 (Estimation and Selection if Actuarial Models)

STAT160 (Introductory Statistics)

STAT251 (Introduction to Probability)

STAT351 (Intermediate Probability)

University of the Free State (2014-2018)

CT8 (Financial Economics)

CA1 (Assets and Liabilities)

ST5 (Finance and Investments)

WKS114 (Introduction to Mathematical Statistics)

Student Supervision

Name	Position	Dates of supervision
Prabhraj Kaur Bain	Masters student (Thesis)	2021F–2022S
Juandre Scheltema	Masters student (Thesis)	2016-2017
Josiah Meyer	Honours student (Thesis)	2017-2018
Pierre Janeke	Honours student (Thesis)	2017-2018
Enrico Scheltema	Honours student (Thesis)	2017-2018

I am in charge of the actuarial internship program, responsibilities include:

- Marking of students projects
- Providing guidance on students projects
- Regular meetings with students to discuss their internship/work program
- Regular meetings with the students' managers to discuss their progress and performance
- Building relationships with the actuarial industry, both in order to increase the profile of our students, but also to provide for the needs of the industry.

There are usually about 10 students that go on internship for 18 months. They have to submit a quarterly internship report that I mark and discuss with them. I also have meetings with them (usually at their offices, but no online) as well as meetings with their managers.

I typically spend 6-8 hours per student.

University Service

DIRECTOR AND TREASURER: Do It With Class Young People's Theatre Inc. (DIWC) (Nov 2021 – Current).

TREASURER: South Saskatchewan Youth Orchestra (SSYO) (Jan 2022 – Current).

EXTERNAL EXAMINER: University of the Free State on behalf of the Actuarial Society of South Africa. (2020 - Current).

EXECUTIVE OF COUNCIL: University of Regina (2020 - Current)

MEMBER OF TRUST FUND COMMITTEE: URFA (2021 - Current)

UNDERGRADUATE CURRICULUM COMMITTEE: Department of Mathematics and Statistics (2021 – Current)

Andrei Volodin

Professor of Statistics

andrei.volodin@uregina.ca, (306) 585 4771,

Education and Professional Development

PhD, University of Regina, 2003

Kandidat Nauk, the USSR, 1991

Employment History

July 1, 2022 promoted to Professor at the Department of Mathematics and Statistics, University of Regina.

Teaching History

AcSc 418, 456

CS 712

MATH 101, 395 AB

STAT 100, 160, 251, 252, 351, 362, 418, 451, 452, 456, 471, 495(AD, AE), 818, 851, 852, 855, 862, 871, 872, 890(AD, AE, AH, AI, AJ, AS, AW)

Student Supervision

Name	Position	Dates of supervision
George Teye	Master's	2011-2013
Suporna Das	PhD	2011-2015
Fatemeh Shakhsesalim	Master's	2013-2015
Jie Ding	Master's	2013-2015

Isaac Kwarteng	Master's	2014-2016
Yanzhao Cheng	Master's	2014-2016
Christopher Mark Atkinson	PhD	2012-2017
Tannen Acose	Master's	2015-2017
Rana Alahmadi	Master's	2015-2017
Rubing Luo	Master's	2015-2017
Ismaila Haruna	Master's	2015-2017
Adam Kehler	Master's	2016-2018
Thuntida Ngamkham	PhD	2013-2018
Adeola Adegoke	Master's	2016-2018
Daniel Fleischhaker	Master's	2017-2019
Salma Saad	PhD	2013-2019
Jingwen Liu	Master's	2017-2019
Kang Jin	Master's	2017-2019
Uchenna Anthony Ndulaka	Master's	2017-2019
Sichen Liu	Master's	2018-2020
Chengyu Gao	Master's	2018-2020
Raymond Benjamin Afful	Master's	2018-2020
Manpreet Kaur	Master's	2019-2021
Khaysa Osmanli	Master's	2019-2021
Jasmine Kaur	Master's	2019-2021
Peter Ajayi	Master's	2019-2022

Currently supervising eleven PhD and six Master students, all in good standing and will defend their theses soon.

University Service

Department of Mathematics and Statistics: Curriculum Committee, Committee for Research, Student and Faculty Engagement Working Group, Committee on Graduate Studies, Co-op Coordinator.

Faculty of Science: Review Committee, Representative to the Faculty of Engineering, Nomination Committee.

Faculty of Graduate Studies and Research: Faculty Council, Chair of the Vanier Selection Committee, NSERC PhD Scholarship Committee, NSERC USRA Committee, NSERC CGS Masters Committee.

University of Regina: Chair of the Council Committee on Research, Council Committee on Undergraduate Awards, Council Committee on Budget, Review Committee, Joint Council/Senate Committee on Ceremonies, Council Committee on Academic Mission.

University of Regina Faculty Association: Treasurer, Trustee, Member of the Financial Committee.

Various Ad Hoc committees.

Scholarly Research

There are 63 publications during 2013-2022 in peer reviewed journals. Because I need to fit the whole CV in 3 pages, I present only 10 most resent. All publications can be found on my Web page https://uregina.ca/~volodin/publ.html

1. Ordóñez Cabrera, Manuel; Rosalsky, Andrew; Ünver, Mehmet; Volodin, Andrei .On the concept of B-statistical uniform integrability of weighted sums of random variables and the law of large numbers with mean convergence in the statistical sense. TEST 30 (2021), no. 1, 83–102.

2. Hu, Tien-Chung; Rosalsky, Andrew; Volodin, Andrei; Zhang, Sen. A complete convergence theorem for row sums from arrays of rowwise independent random elements in Rademacher type p Banach spaces. II. Stoch. Anal. Appl. 39 (2021), no. 1, 177–193.

3. Giuliano, R.; Ordóñez Cabrera, M.; Volodin, A. On the sub-Gaussianity of the r-correlograms. Teor. Veroyatn. Primen. 65 (2020), no. 3, 602–616; reprinted in Theory Probab. Appl. 65 (2020), no. 3, 470–481.

4. Salimov, Rustem; Yang, Su-Fen; Volodin, Andrei; Volodin, Igor. Estimation of mean value of a normal distribution with constraints on the relative error and d-risk. J. Stat. Comput. Simul. 90 (2020), no. 7, 1286–1300.

5. Ordóñez Cabrera, Manuel; Rosalsky, Andrew; Ünver, Mehmet; Volodin, Andrei. A new type of compact uniform integrability with application to degenerate mean convergence of weighted sums of Banach space valued random elements. J. Math. Anal. Appl. 487 (2020), no. 1, 123975, 17 pp.

6. Hu, Tien-Chung; Rosalsky, Andrew; Volodin, Andrei. Complete convergence theorems for weighted row sums from arrays of random elements in Rademacher type p and martingale type p Banach spaces. Stoch. Anal. Appl. 37 (2019), no. 6, 1092–1106.

7. Wu, Yi; Wang, Xuejun; Hu, Tien-Chung; Ordonez Cabrera, Manuel; Volodin, Andrei. Limiting behaviour for arrays of rowwise widely orthant dependent random variables under conditions of R–h-integrability and its applications. Stochastics 91 (2019), no. 6, 916–944.

8. Wu, Yi; Wang, Xuejun; Hu, Tien-Chung; Volodin, Andrei. Complete f-moment convergence for extended negatively dependent random variables. Rev. R. Acad. Cienc. Exactas Fís. Nat. Ser. A Mat. RACSAM 113 (2019), no. 2, 333–351.

9. Wang, X. J.; Hu, S. H.; Volodin, A. I. Moment inequalities for m-NOD random variables and their applications. Teor. Veroyatn. Primen. 62 (2017), no. 3, 587–609; reprinted in Theory Probab. Appl. 62 (2018), no. 3, 471–490.

10. Shen, Aiting; Volodin, Andrei. Weak and strong laws of large numbers for arrays of rowwise END random variables and their applications. Metrika 80 (2017), no. 6-8, 605–625.

Yang Zhao

Associate Professor

yang.zhao@uregina.ca, (306) 585 4348

Education and Professional Development

Ph.D. in Statistics & (2005) & University of Waterloo, Canada

M.Sc. in Statistics & (2000) & University of Victoria, Canada

B.Sc. in Statistics & (1992) & Nankai University, China

Employment History

Tenured Associate Professor, University of Regina (July 2011 - present)

Teaching History

STAT 160 – Introductory Statistics: Winter 2014/2017/2019, and Fall 2014/2015/2017/2019/2020/2021

STAT 354 – Linear Statistical Models: Winter 2012/2013, and Fall 2013/2014/2015/2017/2019/2020/ 2021/2022

STAT 357 – Sampling Theory: Winter 2015/2016/2017/2019/ 2020/2021/2022

STAT 384 – Categorical Data Analysis: Fall 2012/2013

STAT 855 – Generalized Linear Models: Winter 2014/2016/2021, and Fall 2012

STAT 890AD – Analysis of Longitudinal Data: Winter 2012/2020, Fall 2016, and Summer 2022

STAT 890AG – Statistical Analysis with Missing Data: Fall 2016

Student Supervision

Name	Position	Dates of supervision
Isaac Kwarteng	PhD	Jan 2023 - now
Jin Qin	PhD	Sept 2022 - now
David Luke Thiessen	PhD	Sept 2017 – Dec 2022
Yun Peng	PhD	Jan 2016 – April 2023
Shang Wang	Master (essay)	May 2016 – Aug 2015
Junbo Zhao	Master	Sept 2014 – Aug 2015
Jian Wang	Visiting Scholar	May 2014 – Aug 2014
Meng Liu	Postdoc	May 2013 – Aug 2013
Qian Liu	Master	Sept 2012 – April 2016

Sheng Li	Master	Sept 2011 – April 2014
Zhenyu Yang	Master	Sept 2011 – May 2015
Wei Tang	PhD	Sept 2009 – March 2014
Meng Liu	PhD	May 2009 – April 2013

Sheng Li is incomplete. Yun Peng was inactive during May 1st 2021 – Aug 31, 2022.

University Service

Graduate thesis committees: Master's thesis (6), and PhD thesis (9) (2012 – now)

Department graduate scholarship/research/undergraduate/graduate study committee (2009 – now)

Science faculty review committee (2019 – 2021)

CANSSI member institutions voting representative for the University of Regina (Apr. 2022 - now)

Organizer and chair for CANSSI Saskatchewan HSCC winter 2022 webinar series (2021 – 2022)

Organizing committee for the opening event of CANSSI Prairies (2022)

Elected Regional Representative (for Manitoba-Saskatchewan-NWT-Nunavut) on the Board of Directors of the Statistical Society of Canada (SSC, Jul. 2020 - Jun. 2022)

Organizing committee for a student poster event during the first Data Science Bootcamp for graduate and senior undergraduate students at the University of Saskatchewan (June, 2019)

Search committee for a data science position in computer science (2019)

We (I and 6 professors from the University of Saskatchewan) established Canadian Statistical Sciences Institute (CANSSI) Saskatchewan Health Science Collaborating Centre (HSCC, 2018)

Steering Committee of CANSSI Saskatchewan HSCC (Apr. 2018 - Now)

Department Statistics program review committee (2016 – 2017)

Chair for Master's thesis defenses (2016)

Reviewer for NSERC grant applications (2016)

Science fair judge in Regina Regional Science Fair held in the university (2015)

Organizer and chair of a scientific section in the International Chinese Statistical Association (ICSA) - Canada Chapter Symposium (2015).

Chair of a scientific session in ICSA - Canada Chapter 2013 Symposium (Aug. 2013).

Referee for more than 20 journals and reviewed 28 manuscripts and a chapter book (2012 – now)

SSC local representative (Jul. 2012 - Jun. 2015, term 2; Jul. 2009 - Jun. 2012, term 1).

SSC Young Investigators Committee (Jul. 2010 - Jun. 2013)

Scholarly Research

Thiessen, D.L.*, Zhao, Y. and Tu, D-S. (2022) Unified estimation for Cox regression model with nonmonotone missing at random covariates. Statistics in Medicine, 30;41(24):4781-4790. doi.org/10.1002/sim.9512.

Liu, M.*, Zhao, Y. (2022). Weighted generalized estimating equations and unified estimation for longitudinal data with nonmonotone missing data pattern. Statistics in Medicine, 30;41(7):1148-1156. doi: 10.1002/sim.9246.

Zhao, Y. (2022). Maximum likelihood estimation of missing data probability for nonmonotone missing at random data. Statistical Methods & Applications. doi.org/10.1007/s10260-022-00650-5.

Zhao, Y. (2022). Diagnostic checking of multiple imputation models. AStA Advances in Statistical Analysis, 106, 271–286. doi.org/10.1007/s10182-021-00429-1.

Zhao, Y., Liu, M.* (2021). Unified approach for regression models with nonmonotone missing at random data. AStA Advances in Statistical Analysis, 105, no. 1, 87-101. doi.org/10.1007/s10182-020-00389-y

Zhao, Y. (2020). Statistical inference for missing data mechanisms. Statistics in Medicine, 39(28):4325–4333. doi.org/10.1002/sim.8727

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