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Preface

The Journal of Undergraduate Studies at Trent (JUST) was founded in 2007 on the belief that undergraduate research is an integral aspect of the university community. Nowhere is this more relevant than Trent, where we pride ourselves on integrating research into the undergraduate experience. Being one of the best undergraduate universities in Canada, JUST offers a unique opportunity for undergraduate students to publish their research at a local level. We strive to accomplish the above through the following mandate:

1. By increasing awareness of exemplary undergraduate research in all academic fields at Trent University through publication in an open access format:
 - a) Particularly focusing on increasing awareness among new students to inspire their future research;
 - b) Focusing on increasing awareness among Alumni to help connect them to the undergraduate student research community;
2. By providing publication opportunities to undergraduate students while allowing all authors to maintain copyright privileges;
3. By collaborating with academic and research-focused groups at Trent University to highlight undergraduate research in various fields;
4. By increasing the profile of JUST as a publication in the Trent and Peterborough communities;
5. By providing opportunities for undergraduate students to engage with and be part of the publishing process from an editorial standpoint.

I would like to thank all of the people who made this edition possible. Thank you to the authors who submitted their work to the journal and made revisions when necessary. Thank you also to all of the people at Sadleir House, especially all the support we have received from Dwayne Collins. Most of all, thank you to the amazing section editors Ginton Lextroy Hanover, William Kim, Saby Mathavarajah, Grace McKinney and Tonya-Leah Watts without whom this volume would certainly have never been completed. It is your diligence and dedication that has shaped the revival of the Journal of Undergraduate Studies at Trent, and I would like to extend my deepest thanks.

Sincerely,

Hamza Khattak
Chief Editor
Journal of Undergraduate Studies at Trent

For inquiries please contact just@trentu.ca.

Editorial Board

Glinton Lextroy Hanover – *Section Editor - Sciences*

I am an international student from Guyana. This year I completed my Honors B.Sc. in Biochemistry and Molecular Biology at Trent University. Of my many interests, I am particularly passionate about Healthcare and Medical Research. During my 3rd year at Trent, I was very happy to be employed as a Laboratory Assistant in Dr. Janet Yeess lab concerned with unravelling the molecular biology of *Giardia intestinalis* - an intestinal parasite responsible for the disease Giardiasis which has 280 million symptomatic cases each year. This position led me into completing a research project under Dr. Yeess supervision which characterized the putative transcription factor p105 implicated in the regulation of *Giardia intestinalis* core histone proteins, which are critical to the structural integrity of the parasites genetic information. After Trent, I will be completing my M.Sc. at the University of Saskatchewan under the supervision of Dr. Andrew Freywald and Dr. Franco Vizeacoumar. There, my project will be focused on overcoming anti-epha2 resistance in triple-negative breast cancer. Outside of my academic life, I enjoy playing chess in Trents Chess Club, soccer in Trent Intramural League and tutoring Biology and Chemistry courses for the respective departments at Trent. It was a pleasure working along with a team of motivated editors to produce what, Im sure, is a great 2017-2018 JUST Journal issue. A big congratulation to all the authors whose work was selected for this years issue!



Hamza Khattak – *Chief Editor*

This year I graduated from a Honours B.Sc in Physics and Chemistry. My experience in research has mostly come through NSERC USRA research over the summers, from photonics research under Aaron Slepko, work on molecular hydration under Igor Svischev to studying *Daphnia* nutrition under Paul Frost. These experiences have taught me a great deal not only about the fields themselves but science in general and I would recommend summer research to any inquisitive science students. Aside from research, I also enjoy experimenting with new forms of photography with the Trent Visual Arts Network. This September I will be starting my Master's at McMaster to study soft condensed matter under Kari Dalnoki-Veress. Being on JUST has been a great experience these past couple of years and I would like to thank everyone involved, especially Pippa O'Brien who spearheaded reviving the journal when I started at JUST.



William Kim – *Section Editor - Sciences*

I am at Trent entering the fourth year of my Bachelors of Biochemistry and Molecular Biology at Trent University. I am currently a science research assistant studying the gene expression in *Daphnia* under various stressors while being supervised by Dr. Paul C. Frost, Dr. Robert J. Huber, and Dr. Aaron B. A. Shafer. As of right now, I have held two USRAs. I enjoy teaching and when I am not busy, I enjoy the extra hours of sleep that I can get. In future, I am not too sure of what type of Masters degree I am interested, but hopefully I will figure it out.



Saby Mathavarajah – *Section Editor - Sciences*

I am a science editor for the Journal of Undergraduate Studies at Trent University (JUST) for 2018. Soon I will graduate from Trent University with a Bachelors of Science Honors in Biochemistry and Molecular biology. I will be attending graduate school at Dalhousie University for a M.Sc. in Pathology at the Dellaire Lab. I will be studying Cancer biology using zebrafish as a model organism. My background in science comes from my three NSERC-USRA terms, two reading courses, and an undergraduate thesis. I have worked with Dr. Marguerite Xenopoulos in aquatic microbiology and Dr. Robert J. Huber on human disease, specifically studying CLN5 and CLN3 disease using *Dictyostelium discoideum*. I read about science all the time, so I enjoyed this experience. We hope you enjoyed reading the journal just as much!



Grace McKinney – *Section Editor - Humanities*

Hello! I recently completed a Bachelor of Science in Biology and Anthropology with a specialization in Conservation Biology. Currently, I am pursuing a Masters in Environmental and Life Sciences. Although my studies fall mainly in the Sciences, I am passionate about the Humanities. Holistic exploration into our interactions, be that between each other, with the natural world, or with our past, provides a beautiful opportunity to better understand both ourselves, and those around us. It is this ability to share and experience the writing of others that draws me to JUST. In my opinion, being proficient in a topic is useful, but it is only when knowledge or stories are shared that they become truly influential. It has been a privilege reading and editing the papers presented in this year's edition. Thank you to those who submitted for making this journal possible.



Tonya-Leah Watts – *Section Editor - Science*

I am in my fourth year at Trent University in the Honours Biomedical Sciences Program with plans on pursuing a career in medicine. By following my passion for learning and health sciences, I've had the chance to take part in many incredible opportunities, from working in a Neuroscience lab at the SickKids Research Institute, to being a counsellor for the TRACKS Youth Program, to participating as a peer editor for JUST 2017/18. Not only have these experiences been enriching in their own unique ways, but they have also allowed me to meet many inspiring individuals who have empowered me to continue following my dreams. When I am not working in a lab or studying for a test, there's a good chance that I'm preparing for a concert with the Peterborough Singers or All Saints choir, running an event with the Trent Pre-Medical Society, or bringing my A-game at the squash courts. I hope you enjoy this year's issue of the journal, and perhaps you'll be in one of these books in the future!

