Editor's Note
Managing Editor’s Note

The Binghamton University Undergraduate Journal is proud to complete its fifth volume. Over the past five years, the journal has contributed to faculty mentored undergraduate research in the arts, sciences, humanities and social sciences. Article submissions have grown steadily, and readership and student involvement has increased. The ongoing support of faculty advisors and the hard work of our editorial board, as well as our undergraduate students' interest, have broadened our academic visibility to the Binghamton community and to academia at large. This year, the Binghamton University Undergraduate Journal continues its mission of advancing undergraduate students' scholarship and contribution to undergraduate research under the leadership of Valerie Imbruce. She ensures that our online journal lives up to the standards and expectations established by previous editors and editorial boards.

In this fifth volume, we have presented a diverse selection of scholarly academic research from a broad range of disciplines, from comparative language acquisition and concrete poetry, to the study of cardiovascular disease patients and the growing concerns on E-cigarette usage among adolescents. The Binghamton University Undergraduate Journal is proud to advance different disciplines with significant implications to our Binghamton community.

Finally, we would like to express our gratefulness to the Editorial Board members, the faculty advisors and reviewers, and to acknowledge their generous time, help, advice, and recommendations. This journal is not possible without their ongoing support and guidance, and we are greatly indebted to them for their time and effort. The Undergraduate Research Center staff and I have dedicated ourselves to improving the Binghamton University Undergraduate Journal and maintaining it standard of excellence. We hope that this issue showcases efforts of our current scholars and honors the legacy of scholars past.

Jafar Shokrolah Zadeh
Managing Editor
EDITORIAL SUPPORT TEAM:
UNDERGRADUATE RESEARCH CENTER

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Undergraduate Research Center

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RACHEL COKER  
Division of Research

Rachel Coker, director of research advancement at Binghamton University, has more than 15 years of experience in journalism and public relations. Since joining the University’s staff in 2005, she has edited several campus publications and served as an adjunct instructor of journalism at Binghamton and SUNY Broome Community College. She earned a bachelor’s degree from the University of Rochester and a master’s degree from the Columbia University Graduate School of Journalism.

CONGRUI JIN  
Mechanical Engineering

Congrui Grace Jin has been an assistant professor at the Department of Mechanical Engineering at Binghamton University since 2015. Her research interests include contact mechanics, fracture mechanics, wave propagation, rock mechanics, and composite materials. She has won Summer Scholars and Artists Program Award and S3IP Undergraduate Research Initiative Award in 2016. She published more than 30 peer-reviewed journal articles. She edited one book for Springer and published two book chapters. She served as a reviewer for 25 international scientific journals.

JEFFREY MATIVETSKY  
Physics, Applied Physics and Astronomy

Jeffrey Mativetsky's research centers on the relationships between nanoscale structure and electrical function in organic materials for solar cells and electronics. Prof. Mativetsky received his PhD in Physics from McGill University (Canada) in 2006. From 2007-2010 he was a Marie Curie Fellow at the Supramolecular Science and Engineering Institute in Strasbourg, France, and from 2010-2012 he was a Camille and Henry Dreyfus Environmental Chemistry Fellow at Princeton University. He joined Binghamton University in the fall of 2012.
WILLIAM D. SPANGLER  
*School of Management*

William D. Spangler, associate professor of management at Binghamton University, has over 30 years of experience in teaching and research. His research interests include personality and leadership, computerized content analysis of leader personality and leader behavior and motivation.

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ELIZABETH BROWN  
*Assessment and Scholarly Communications at Binghamton University Libraries*

Beth is currently the Director of Assessment and Scholarly Communications at Binghamton University Libraries and also serves as subject liaison for Chemistry, Physics and Astronomy, Mathematical Sciences and Materials Science. She has received a BA in Chemistry from the University of Virginia, an MS in Chemistry from the University of Pittsburgh, and an MLIS in Librarianship from the University of Texas at Austin. Her current research interests include identifying disruptors within the scholarly community and how research materials are marketed to library users and patrons. She has served in various roles in the Physics Astronomy Math (PAM) Division of the Special Libraries Association (SLA), the Binghamton Local Section of the American Chemical Society, and the Upstate New York Chapter of the Special Libraries Association.

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ANNEMARRIE MAAG-TANCHAK  
*Art Editor*

Annemarie Maag-Tanchak is a senior majoring in Art History and double minoring in Graphic Design and German. She is the design manager and former president of the BU Fine Arts Society, BU's only open studio art club, and works at the Art Co-Op, the on-campus art supply store. She has previously interned at an art & history museum in her hometown of Albany, New York and hopes to continue on to a career in museum work or art directorship, either in the US or in Germany.
About Cover Art

The cover illustration was created by Annemarie Maag-Tanchak, the undergraduate Art Editor of BUUJ,

"When I first learned about the Undergraduate Research Center, I was surprised by the range of subjects that students cover in their research. This piece of artwork intends to show the possibilities that come from a university education and the platform the Undergraduate Journal gives to students to showcase their work. I wanted to focus more on the ways different subjects coexist rather than how they are different, and how the Undergraduate Journal has a place for everything under the umbrella of academia. The underlying theme is that the book is only open to one page full of research, just as this is only one year of many publications for the Undergraduate Journal." - Annemarie Maag-Tanchak
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