

*ProQuest*  
*Distinguished*  
*Dissertation*  
*Awards of 2016*

April 25, 2017

University of Michigan  
Rackham Graduate School

**T**he quality and diversity of doctoral dissertations produced each year by Rackham students is key to the distinction that the University of Michigan has earned as one of the world's great research universities. Rackham's doctoral students contribute innovative research and scholarship at the highest level in many fields.

Each year truly exceptional dissertations are recognized with the ProQuest Distinguished Dissertation Awards. Faculty who have served as chairs of dissertation committees nominate outstanding students who have completed their dissertations. These nominations are reviewed by a faculty panel and then read closely by postdoctoral fellows who are members of the Michigan Society of Fellows, a unique interdisciplinary community of outstanding scholars.

The awards are co-sponsored by ProQuest, a global information-content and technology company based in Ann Arbor that publishes nearly 262,000 dissertations and theses annually, including more than 800 by University of Michigan graduate students. We are delighted to have ProQuest as a partner in celebrating the accomplishments of these scholars and recognizing the excellence of their doctoral dissertations.

Carol A. Fierke  
Dean and Vice Provost for Academic Affairs

# GaN Integrated Microsystems for RF Applications

---

## Azadeh Ansari

*Ph.D., Electrical Engineering, University of Michigan, 2016*

*B.Sc., Electrical Engineering, Sharif University of Technology, 2010*

Dr. Azadeh Ansari's path-breaking thesis extends the frontier on gallium nitride (GaN) devices into the 'More than Moore' arena. As solid state devices approach the limits of miniaturization of silicon devices, researchers have turned to other materials to achieve greater packing density at lower power consumption and higher frequencies. This requires fundamental work in solid state design, and that is where Ansari begins. The research confronts challenges in fabricating GaN layer at the scale of 250 nm for N/MEMS. She then goes on to design GaN-on-Si resonators and filters that achieve the highest figure of merit, as of 2015, and high power handling capabilities. Next, she integrates the resonator with a high-electron-mobility transistor to manufacture a Resonant-Body HEMT which can serve as a high frequency, selective oscillator that can be used for RF transmission. She further improves the quality factor through a novel "depletion-mediated" piezoelectric transduction. She innovates further by designing and fabricating phonon traps that do away the need for tethers and placing an HEMT in the middle of a phonon trap, doing away with the steps where noise is introduced. A single phonon trap acts as a frequency-selective element and amplifier, greatly enhancing the quality, signal to noise ratio and power handling capability of a GaN integrated circuit. In sum, Ansari has extended the range of GaN devices achieving unparalleled and desirable features at a time when GaN manufacturing is in its infancy. Her research is poised at making an enormous contribution to extending electronics to frontier, critical applications such as sensing faults in aerodynamic structures.

*- Comments by Aniket Aga*

Dissertation Committee:

Mina Raies-zadeh, Chair

Pei-Cheng Ku

Kevin Pipe

Jasprit Singh

# Microbiota-based Models Enhance Detection of Colorectal Cancer

---

## Nielson T. Baxter

*Ph.D., Microbiology and Immunology, University of Michigan, 2016*

*B.S., Biology, Indiana University, 2011*

This dissertation examines the potential for using human gut microbiota for detecting colorectal cancer, the third leading cancer causing death in the United States. Using a combination of mouse model and a new stool DNA test that combines microbial biomarkers, Dr. Baxter elegantly shows that the composition of the gut microbiota can potentially influence an individual's susceptibility to colorectal cancer, that shifts in microbiota composition can be used to predict the presence of lesions, and that microbiota-based screening can be combined with fecal immunochemical test into a single test with improved sensitivity for colonic lesions. In addition to creating a test that is now under application for patent, Baxter's developments offer the potential to drastically increase the number of samples available for studying the microbiota's role in colorectal cancer and many other diseases, particularly through longitudinal study of microbiota, making it easier to detect shifts in the structure of an individual's microbiota. Baxter's combination of basic and translational research, communicated in language understandable to a general audience, warrants the high praise of a distinguished dissertation.

*- Comments by Lydia Beaudrot*

Dissertation Committee:

Patrick D. Schloss, Chair

Grace Y. Chen

Thomas M. Schmidt

Vincent Bensen Young

# Stretchable Electronic and Photonic Materials from Self-Organized Nanoparticles

---

**Yoonseob Kim**

*Ph.D., Chemical Engineering, University of Michigan, 2016*

*B.S., Chemical Engineering, Hanyang University, 2010*

Dr. Kim's thesis explores the mechanism and dynamics of self-organization of nanomaterials in the solid-state, makes an important step forward in the preparation of stretchable electronic materials and develops theory to understand and analyze the novel properties of these new materials. Stretchable electronic materials have future applications in neuroprosthetic and cardiostimulating implants, soft robotics, medicine, stretchable display, optoelectronics, and energy storage devices. Furthermore, nanomaterials with reversible modulation of optical properties could be transformative for solid-state optical devices, microelectromechanical systems and other technological areas of chiroptical materials. This thesis presents breakthrough work to develop stretchable electronic materials with enhanced properties. Stretchable conductors were prepared using spherical gold nanoparticles deposited by either layer-by-layer deposition (LBL) or vacuum-assisted flocculation (VAF) to allow precise control of nanoscale composition and thickness. Both composites lead to high conductivity and stretchability and demonstrate electronic tunability under mechanical stress due to the self-organization of nanoparticles. A variation of classical percolation theory was developed to explain nanoparticle dynamics in such composites. Finally, nanocomposite materials were prepared whose optical activity can be reversibly reconfigured and cyclically modulated by macroscale stretching. These experiments showed the fundamental possibility of reconfigurable self-assembled structures that exhibit high rotatory optical activity which can be cyclically modulated by mechanical stretching. The new family of composites developed in this work will enable the combination of mechanical, plasmonic and excitonic properties of various nanoscale 'building blocks.'

*- Comments by Carol A. Fierke*

Dissertation Committee:

Nicholas Kotov, Chair

Ellen M. Arruda

Oriol Arteaga

L. Jay Guo

Jinsang Kim

Joerg Lahann

# Evaluating the Role of Long Non-coding RNAs in X-chromosome Inactivation

---

## Emily Maclary

*Ph.D., Human Genetics, University of Michigan, 2016*

*B.A., Biology, Williams College, 2010*

Dr. Maclary's thesis provides an insight into the molecular processes underlying X inactivation in mammals. This is an important question in molecular biology and a key illustrative example of the power of epigenetics in the regulation of gene expression. The dominant theory for this process – where gene expression from one X chromosome in a female is silenced – is that non-coding RNA from the Xist gene causes epigenetic silencing of the inactive chromosome. Tsix, the anti-sense transcript to Xist, has been expected to play an important role in keeping the other X chromosome active. Through a series of elegant experiments Maclary reveals that Tsix can be dispensable in the initiation phase of the X inactivation process, both in relation to imprinted and random X inactivation. That Tsix is not absolutely required for X inactivation at this phase is a paradigm shifting result in this scientific field, and to convincingly show this required the development of various highly technical skills in molecular and developmental biology. Maclary further presents novel theory and experimental methodology that will help to reveal what else might generate and maintain X inactivation. These ideas are likely to help move this field forward in the light of her experimental insights regarding the dispensability of Tsix in certain aspects of X inactivation.

*- Comments by Michael Garratt*

Dissertation Committee:

Sundeep Kalantry, Chair

David T. Burke

Sally Ann Camper

Miriam H. Meisler

Trisha Wittkopp

# Presidential Policymaking at the State Level: Revision through Waivers

---

## Elizabeth Mann

*Ph.D., Political Science, University of Michigan, 2016*

*B.A., Political Science, University of Michigan, 2008*

Dr. Mann has produced a superb dissertation. She examines the use of waivers, which are exemptions from U.S. federal law granted by the president. Waivers are often designed to allow states to experiment with innovative policies and are an important but under-studied form of presidential policymaking. Mann makes an extremely convincing case for the importance of waivers, and has devised a theory for understanding when and why presidents use them. Mann's study of waivers helps us understand what presidents do when they cannot push their policy initiatives through Congress. She focuses on three issue areas—education, welfare, and Medicaid—and chronicles the use of waivers in the administrations from Reagan through Obama. Her research method is ground-breaking; she created an extensive dataset, and supplemented this with archival research and interviews. Her research makes a significant contribution to the study of American politics and cuts across several subfields. Her dissertation is also very well written and accessible for readers outside her discipline. I see it being widely read and making an impact on the way that people outside the academy understand U.S. politics. This is fascinating and important research that deserves recognition.

*- Comments by Amanda Alexander*

Dissertation Committee:

Charles Shipan, Chair

Elisabeth Gerber

William G. Howell

John E. Jackson

Robert W. Mickey

# No Radical Hangover: Black Power, New Left, and Progressive Politics in the Midwest, 1967-1989

---

## Austin McCoy

*Ph.D., History, University of Michigan, 2016*

*M.A., History, Kent State University, 2009*

*M.A., African American and African Studies, The Ohio State University, 2007*

*B.A., History, The Ohio State University, 2004*

Dr. Austin McCoy's *No Radical Hangover* shows how radical social movements in Detroit and northern Ohio were recomposed over the 1970s. The dissertation opens with a discussion of the immediate aftermath of the Detroit uprising of 1967, showing how an autonomous Black radical politics crystallized at this moment. From here, McCoy tracks the subsequent emergence in Detroit of a coalition against police violence in the early 1970s, which then flows into campaigns to exert democratic control over a deindustrializing economy. McCoy weaves together this account of shifts in Detroit-based radicalism with histories of social and political action campaigns in the broader Midwest, and particularly in northern Ohio, including campaigns to end the war in Indochina and to manage the social costs of deindustrialization. This impressively researched dissertation reframes histories of Left social movements in the 1960s and '70s. By tracking the reconstitution of radical social movements through the 1970s, and by juxtaposing Detroit- and Ohio-based movements, *No Radical Hangover* shows the inadequacy of 'declension narratives' of 1960s radicalism, fleshes out the regional contexts of local organizing, and demonstrates the mutually co-constitutive quality of radical projects often treated as if they are incommensurable, including anti-policing, anti-imperialist, and economic democracy campaigns.

- *Comments by Amanda Armstrong*

Dissertation Committee:

Matthew Countryman, Co-Chair

Matthew D. Lassiter, Co-Chair

Howard Brick

Stephen M. Ward

# Humor of Skepticism: Therapeutic Laughter in Early Modern Literature

---

## Cassie Miura

*Ph.D., Comparative Literature, University of Michigan, 2016*

*B.A., English, Portland State University, 2008*

The *Humor of Skepticism: Therapeutic Laughter in Early Modern Literature* is a brilliant, wide-ranging, and deeply erudite exploration into the theme of laughter in early modern literature, particularly its engagements with classical traditions of skepticism and epicureanism. In doing so, Dr. Miura connects the theme of skeptical laughter to ethical projects of self-care and emotional and intellectual therapy. Although it sticks closely to a series of important texts, it also looks past those texts to the wider cultural, intellectual, social, and political context of early modern Europe, often drawing brilliant and meaningful connections. Despite its wide range, it retains a subtle touch, showing both the many similarities and shared projects of a diverse set of literary figures like Michel de Montaigne, Richard Burton, Lucy Hutchinson, and John Milton and their many important personal and contextual differences. It also attends brilliantly to the complicated and productive work of translation and is itself a skillful work of translation, not only of classical and early modern texts and concepts but also (though sparingly) of the potentials and limits of skeptical laughter in our own present political and social contexts.

*- Comments by Kevin Ko*

Dissertation Committee:

Douglas Trevor, Chair

George P. Hoffmann

Peggy S. McCracken

Yopie Prins

Michael C. Schoenfeldt

# Statistical Analysis of Complex Data: Bayesian Model Selection and Functional Data Depth

---

## Naveen Narisetty

*Ph.D., Statistics, University of Michigan, 2016*

*M.S., Statistics, Indian Statistical Institute, Kolkata, 2012*

*Bachelor of Statistics, Indian Statistical Institute, Kolkata, 2008*

Dr. Narisetty's dissertation addresses two important problems that arise in today's era of big data: model selection for high dimensional data and data depth for functional data. In high dimensional data the number of variables is much greater than the sample size. Dr. Narisetty developed a novel approach for model selection which uses sample size dependent priors in a bayesian framework. In his dissertation, Dr. Narisetty not only developed the theoretical framework for this approach, but also an efficient computational algorithm which outperforms existing methods. In the second part of his dissertation, Dr. Narisetty develops a new functional analysis technique, extremal depth, for use in exploratory analysis of functional data. Again, this new method outperforms existing techniques. Both contributions are original and important, and this work will have lasting impacts in the field of statistics and other data-rich fields of study.

*- Comments by Mac Cathles*

Dissertation Committee:

Xuming He, Co-Chair

Vijayan Nair, Co-Chair

Bhramar Mukherjee

Long Nguyen

# Controlling Hazardous Releases While Protecting Passengers in Civil Infrastructure Systems

---

## Sara Rimer

*Ph.D., Environmental Engineering, University of Michigan, 2016*

*B.S., Mechanical Engineering and Mathematics, Central Michigan University, 2010*

Dr. Rimer's dissertation is on the important topic of real-time detection and mitigation of human exposure to hazardous chemicals in public spaces. Her ultimate objective is to develop intelligent public infrastructure systems that automatically respond to hazardous contaminant disasters. Sara's work makes a number of contributions which advance the field of civil systems infrastructure. She develops a flow control computer model of fluid dynamics using predictive control optimization techniques. She then applies this model to a cyber-physical prototype of an enclosed tunnel with a programmable sensor actuator control system. In addition, Sara develops and applies an agent-based model in order to investigate emergent individual behaviors related to evacuation decision-making. Sara's impressive body of dissertation work is critical and timely given the increased threat of biological (airborne) warfare, rising urban populations, and the availability of smart sensing technologies. Further, Sara succeeds in delivering a comprehensive interrogation of her contamination detection and mitigation system, bridging behavioral modeling with computational modeling of physical systems in novel and exciting ways.

*- Comments by Tierra Bills*

Dissertation Committee:

Nikolaos Katopodes, Chair

Elizabeth Eve Bruch

Aline J. Cotel

Branko Kerkez

# Self-Health: The Politics of Care in American Literature, 1793-1873

---

## Emily Waples

*Ph.D., English Language and Literature, 2016*

*M.St., English and American Studies, Oxford University, 2007*

*A.B., English Language and Literature, Vassar College, 2006*

Dr. Waples' dissertation is a thought-provoking, thoroughly-researched, and original cultural history of early republican and antebellum U.S. health politics and discourses as reflected and constructed in print culture. Providing a revision of the classical narrative of biopolitics, she argues that during the period the burden of managing populations' biological processes rested less with the state and more with the embodied subject through practices of self-care. *Self-Health* convincingly demonstrates how public health was understood as self-health and how individual health was framed as a civic responsibility, a modality of community health, and ultimately a precondition of citizenship. The dissertation is creatively structured around four central etiological and epistemological concepts, predisposition, miasmatic transmission, racialized immunity, and hereditary degeneration, each connected either with a specific epidemic (yellow fever and cholera) or with a sociopolitical institution (slavery and marriage). In tracking these concepts and the ideas about risk, responsibility, and agency articulated thereof, Dr. Waples analyzes an impressive range of materials, from newspapers and domestic medical manuals to novels (including by canonical authors such as Brockden Brown, Edgar Allan Poe, and Louise Mary Alcott), demonstrating in the process how public understandings of health and medicine were mediated by print culture. Waples' dissertation is impressive in its range, both theoretical and methodological, compelling arguments, and creativity. It eloquently instantiates the promise of an interdisciplinary approach, crossing and contributing to fields such as American literature, cultural and intellectual history, the history of medicine, and biomedical humanities.

*- Comments by Ana Vineia*

Dissertation Committee:

Susan Scott Parrish, Chair

Daniel S. Hack

Kerry C. Larson

Alexandra Stern

# Honorable Mention

---

**Alexander Burnap**

Mechanical Engineering

**Daniel Castro**

Psychology

**Susan Cheng**

Ecology and Evolutionary Biology

**Eli Fahrenkrug**

Chemistry

**Ashley Lemke**

Anthropology

**Kathryn Livingston**

Pharmacology

**Michael MacDonald**

Applied Physics

**Ruth Anna Spooner**

English and Education

# Distinguished Dissertation Award Nominees

---

**Parinaz Ardabili**

Electrical Engineering and Computer Science

**Shanna Ashley**

Immunology

**Joong Hwan Bahng**

Biomedical Engineering

**Laura Cesa**

Chemical Biology

**Heewon Chae**

Business Administration, Strategy

**Youngjun Choe**

Industrial and Operations Engineering

**Eric Ford**

Slavic Languages and Literatures

**Zihuai He**

Biostatistics

**Aleida Higginson**

Atmospheric, Oceanic, and Space Sciences

**Jina Kim**

English and Women's Studies

**Lin Li**

Physics

**Sarah Lipson**

Higher Education, Health Services Organization and Policy

**Matthew Miller**

Astronomy and Astrophysics

**Ibrahim Mohedas**

Mechanical Engineering

**Asaf Peres**

Music Theory

**Katherine Prater**

Neuroscience

**Jennifer Ro**

Cellular and Molecular Biology

**Garrett Ryan**

Greek and Roman History

**Dena Shahriari**

Macromolecular Science and Engineering

**Olga Shalev**

Materials Science and Engineering

**Cybelle Shattuck**

Natural Resources and Environment

**Andre Souza**

Applied and Interdisciplinary Mathematics

**Matthew Stone**

Biophysics

**Rohan Sud**

Philosophy

**Wendy Sung**

American Culture

**Amy Sutton**

Molecular and Integrative Physiology

**Bram ten Berge**

Classical Studies

**Jorge Varela**

Education and Psychology

**Joseph Viscomi**

Anthropology and History

**Sania Zaidi**

Educational Studies: Science Education

The Graduate School acknowledges the special contributions of Professor Donald Lopez and the readers from the Michigan Society of Fellows who devoted a significant amount of thoughtful time to review and recommend the nominations.

**Readers from the Michigan Society of Fellows**

Aniket Aga  
Amanda Alexander  
Amanda Armstrong  
Lydia Beaudrot  
Tierra Bills  
Mac Cathles  
Jana Cephas  
Michael Garratt  
Alice Goff  
Kevin Ko  
Sarah Loebman  
Zhiying Ma  
Yasmin Moll  
Scott Selberg  
Ana Vinea  
Benjamin Winger  
Rebecca Wollenberg

ProQuest's Dissertation Dissemination program was created in 1938 to safeguard threatened scholarly resources, and has been the dedicated steward of graduate works ever since. Our goal is to ensure that dissertations and theses are discoverable and archived in perpetuity as a valuable component of the primary literature in every discipline.

As a committed supporter of graduate education, ProQuest's Dissertation Dissemination program appreciates the opportunity to co-sponsor the Distinguished Dissertation Awards along with the University of Michigan's Rackham Graduate School.



the 1990s, the number of people in the UK who are employed in the public sector has increased from 10.5 million to 13.5 million. The public sector has become a major employer in the UK, and this has implications for the way in which the public sector is managed and the way in which it is funded.

The public sector is a complex and diverse organisation, and it is difficult to define it precisely. However, it is generally understood to include the following:

- The central government and its departments.
- The local authorities and their departments.
- The public corporations and their subsidiaries.
- The public sector pension funds.

The public sector is a major employer in the UK, and it has a significant impact on the economy. The public sector is a major source of government revenue, and it is also a major source of government expenditure. The public sector is a major employer of people, and it is also a major source of government services.

The public sector is a complex and diverse organisation, and it is difficult to define it precisely. However, it is generally understood to include the following:

- The central government and its departments.
- The local authorities and their departments.
- The public corporations and their subsidiaries.
- The public sector pension funds.

The public sector is a major employer in the UK, and it has a significant impact on the economy. The public sector is a major source of government revenue, and it is also a major source of government expenditure. The public sector is a major employer of people, and it is also a major source of government services.

The public sector is a complex and diverse organisation, and it is difficult to define it precisely. However, it is generally understood to include the following:

- The central government and its departments.
- The local authorities and their departments.
- The public corporations and their subsidiaries.
- The public sector pension funds.

The public sector is a major employer in the UK, and it has a significant impact on the economy. The public sector is a major source of government revenue, and it is also a major source of government expenditure. The public sector is a major employer of people, and it is also a major source of government services.

The public sector is a complex and diverse organisation, and it is difficult to define it precisely. However, it is generally understood to include the following:

- The central government and its departments.
- The local authorities and their departments.
- The public corporations and their subsidiaries.
- The public sector pension funds.

The public sector is a major employer in the UK, and it has a significant impact on the economy. The public sector is a major source of government revenue, and it is also a major source of government expenditure. The public sector is a major employer of people, and it is also a major source of government services.