Sydney N. Williams

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sydneynw_at_umich_dot_edu • sydneynw.github.io

Education

Ph.D. Candidate, Biomedical Engineering:
University of Michigan, Ann Arbor, MI
Co-Advisors: Dr. Doug Noll and Dr. Jeff Fessler
Master of Science, Electrical & Computer Engineering 2017
Master of Science, Biomedical Engineering 2015
G.P.A. 3.70/4.00
Dissertation Topic: RF Pulse Design for MRI, Anticipated Graduation Summer 2018

Bachelor of Science, Biomedical Engineering 2013
Illinois Institute of Technology (IIT), Chicago, IL
Minors in Applied Mathematics and Circuits and Systems
G.P.A. 4.0/4.0, Summa Cum Laude

Semester Abroad, Telecommunications Engineering May 2013
La Universidad Politécnica de Madrid, Madrid, Spain
Visiting 4th semester telecommunications student with courses instructed in Spanish

Honors and Awards

Triumph Over Adversity Award 2017
- Granted by the University of Michigan Rackham Merit Fellows Program

Graduate Assistance in Areas of National Need Fellowship 2014-2016
- Granted by the University of Michigan Department of Biomedical Engineering

Outstanding Poster Award 2016
- Granted by the organizing committee of the In Vivo Magnetic Resonance Gordon Research Conference

Magna Cum Laude Presenter's Award 2015
- Granted by the International Society of Magnetic Resonance in Medicine (ISMRM) at the 2015 meeting

Honorable Mention of Graduate Research Fellowship 2014
- Granted by the National Science Foundation (NSF)

University of Michigan Graduate Fellowship 2013-2014
- Granted by the University of Michigan Department of Biomedical Engineering

American Society for Artificial Internal Organs Design Competition 2013
- Undergraduate design team, 3rd place at ASAIO national conference in Chicago, IL for Baby Sounds Monitor

Idea to Product Student Design Competition 2013
- Undergraduate design team, 3rd place at MO-IL Regional Competition in St. Luis, MO for Baby Sounds Monitor

Illinois Institute of Technology Camras Scholar 2009-2013
- Full-tuition academic scholarship for undergraduates based upon high school performance

Orfalea Scholar 2009-2013
- Private local scholarship received annually from the San Luis Obispo Community Foundation based upon scholastic acheivement and pursuit of a health-field degree

Refereed Journal Papers

- **S. N. Williams**, J.F. Nielsen, J.A. Fessler, and D.C. Noll, "Design of spectral-spatial prewinding pulses and their use in small-tip fast recovery steady-state imaging," *Mag. Reson. Med., In Press* vol. 79(3), March 2018. doi: 10.1002/mrm.26794.

- **S. N. Williams**, J.F. Nielsen, J.A. Fessler, and D.C. Noll, "Slab-selective prewinding pulses for steady-state imaging," *In Preparation.*

Conference Papers

- **S. Williams**, M. Harris, J. Furst, and D. Raicu, "Area under the distance threshold curve as an evaulation measure for probabilistic classifiers," *Proc. Int. Mach. Learn. Data Min.* 2013.

Conference Abstracts

- **S. N. Williams**, J-F. Nielsen, J.A. Fessler, and D.C. Noll, "Slab-selective spectral and spectralspatial prewinding RF pulses," *Proc. Int. Soc. Mag. Reson. Med.* 2018, Paris, France.
- **S. N. Williams**, D.C. Noll, and J.A. Fessler, "Minimum out-of-slice error SMS RF pulse design with direct peak, power, and in-slice error constraints," *Proc. Eur. Soc. Mag. Reson. Med. Biol.* 2017, Barcelona, Spain.
- **S. N. Williams**, D.C. Noll, and J.A. Fessler, "Improved simultaneous multislice pulse design directly constraining peak RF amplitude," *Proc. Int. Soc. Mag. Reson. Med.* 2017, Honolulu, HI.
- **S. N. Williams**, D.C. Noll, and J.A. Fessler, "Spectral-spatial RF pulse design with direct constraints on peak amplitude and integrated power," *In Vivo MR Gordon Research Conference* 2016, Andover, NH.
- **S. N. Williams**, H. Sun, J.F. Nielsen, J.A. Fessler, and D.C. Noll, "A spectral-spatial pulse for improved signal recovery in the small-tip fast recovery sequence," *Proc. Int. Soc. Mag. Reson. Med.* 2015, Toronto, Canada. **Magna Cum Laude Award.**

Oral Presentations

- **Proc. Int. Soc. Mag. Reson. Med.**, "Slab-selective spectral and spectralspatial prewinding RF pulses," June 2018.
- **Northwestern U. Biomed. Eng. Dept. Seminar**, "Radiofrequency pulse design for target magnetic resonance imaging applications," February 2018.
- **U. of Michigan Physics Grad. Student Symposium**, "Radiofrequency pulse design for magnetic resonance imaging ," August 2017.
- **U. of Michigan Biomed. Eng. Grad. Student Speaker Series**, "Exciting spins: radiofrequency pulse design strategies for magnetic resonance imaging," August 2015.
- **Proc. Int. Soc. Mag. Reson. Med.**, "A spectral-spatial pulse for improved signal recovery in the small-tip fast recovery sequence," May 2015.

Poster Presentations

- **Proc. Eur. Soc. Mag. Reson. Med. Biol.**, "Minimum out-of-slice error SMS RF pulse design with direct peak, power, and in-Slice Error Constraints," October 2017.
- **Proc. Int. Soc. Mag. Reson. Med.**, "Improved simultaneous multislice pulse design directly constraining peak RF amplitude," April 2017.
- **University of Michigan Engineering Graduate Research Symposium**, "Mitigating RF peak amplitude and power limitations for simultaneous multislice excitation MRI," November 2016.
- **In Vivo MR Gordon Research Conference**, "Spectral-spatial RF pulse design with direct constraints on peak amplitude and integrated power," July 2016.
- **University of Michigan Engineering Graduate Research Symposium**, "RF pulse design for MRI with direct constraint on peak pulse amplitude," October 2015.

Research Experience

fMRI Laboratory, University of Michigan, Ann Arbor, MI 2013-Present

- Mentors: Dr. Doug Noll, Dr. Jeff Fessler, and Dr. Jon-Fredrik Nielsen
- Multi-dimensional and parallel transmit radiofrequency (RF) pulse design
- Steady-state magnetic resonance imaging (MRI) pulse sequences
- k-Space trajectory design

Medical Informatics Laboratory, DePaul University, Chicago, IL 2012
- Mentors: Dr. Daniela Raicu and Dr. Jacob Furst
- NSF-funded summer position researching medical informatics and computer-aided diagnostics
- Data mining and machine learning techniques.
- Development of evaluation metrics for probabilistic multiclass classifiers.

Hand Rehabilitation Laboratory, IIT, Chicago, IL Fall 2011
- Mentor: Dr. Derek Kamper
- Finite-element model of human index finger using MATLAB Simulink

Biomedical Engineering Department, Cal Poly, San Luis Obispo, CA Summer 2010
- Image analysis of ischemic and non-ischemic femoral arteries of mice

Teaching Experience

Music Signal Processing, University of Michigan, Ann Arbor, MI Fall 2015
- Graduate student instructor for freshman undergraduate lab and lecture course instructed by Dr. Jeff Fessler
- Course topices included technical communications skills and basic digital signal processing concepts such as signal sampling, continuous vs. discrete signals, Fourier/spectral analysis, and basic concepts of music theory
- Tasks included directing program labs where students engaged in labs and projects, holding weekly office hours, and grading lab reports

Biomedical Engineering Lab, University of Michigan, Ann Arbor, MI Winter 2015
- Graduate student instructor for third-year undergraduate lab and lecture course instructed by Dr. Dennis Claflin and Dr. Doug Noll
- Course topices included electronic circuits, materials testing, cell culture, and basic engineering statistics and experimental design
- Organized morning lab session, oversaw undergraduate instructor aide, graded lab reports, held weekly office hours, and gave a guest lecture on statistics

Introduction to Biomedical Engineering, IIT, Chicago, IL Fall 2012
- Teaching assistant for freshman undergraduate lab and lecture course instructed by Dr. Bonnie Haferkamp
- Course topices included understanding the rolls of cell and tissue engineering, neural engineering, and medical imaging sub-fields
- Helped develop experimental protocols, setup laboratory, and graded lab reports

Geometry for Architects, IIT, Chicago, IL Fall 2010 and 2011
- Teaching assistant for freshman undergraduate architecture students instructed by Dr. David Maslanka
- Course topices included basic geometry and proofs, pre-calculus, and trigonometry
- Graded worksheets, tutored students, and held exam review lectures

Introduction to Calculus, IIT, Chicago, IL Spring 2012
- Teaching assistant for freshman undergraduate architecture students instructed by Dr. David Maslanka as follow up to‘for Architects”
- Course topices included limits, derivatives, integrals, and other calculus fundamentals
- Graded worksheets, tutored students, and held exam review lectures

Other Experience

Software Developer Intern, Dialysis Clinic Inc., Chicago, IL Summer 2013
- Developer on 2nd-line support team for the nations largest non-profit dialysis company
- Solved user-reported problems via communication and technical skills such as SQL, Classic ASP webpage coding, report design with SQL Server Reporting Services (SSRS)

Private Tutor Varsity Tutors, Chicago, IL 2013
- Independently contracted tutor for middle school, high school, and college students
- Topics instructed included: Algebra 1 and 2, Geometry, Trigonometry, PreCalculus, Calculus, Physics, Chemistry, ACT Math and Science, and Spanish Language

Design Project, IIT, Chicago, IL 2012-2013

- Senior design team creating the Baby Sounds Monitor, a real-time monitoring heart and lung sounds system for newborn infants in the neonatal intensive care unit (NICU)
- Main contributions include the development of signal processing and detection software alerting neonatologists of abnormalities within infant ventilation and heart valve function

Chicago Area Undergraduate Research Symposium, Chicago, IL 2009-2012

- Inter-school board member organizing the Chicago Area Undergraduate Research Symposium, created to provide all students of Chicagoland universities the opportunity to present their research in a professional setting

Professional Affiliations

European Society for Magnetic Resonance in Medicine and Biology (ESMRMB) 2017-Present

- Student member

Graduate Society of Women Engineers (GradSWE) 2015-Present

- Student member
- Team leader for elementary school outreach teaching engineering projects

International Soc. for Magnetic Resonance in Medicine (ISMRM) 2014-Present

- Student member
- Awarded educational stipend for 2015 and 2017 annual meetings

Tau Beta Pi 2011-2013

- National honors engineering society
- Top 8th of engineering class at IIT

Biomedical Engineering Society (BMES) 2012-2013

- Student member
- Attended 2012 BMES Annual Conference in Atlanta in October

Order of Omega Honors Greek Leadership Society 2012-2013

- Initiated student member
- Top 3% academically within fraternity and sorority communities

Organizations

Biomedical Engineering Graduate Student Council 2014-Present

- Co-President leading academic, professional, and social events for the graduate students of the University of Michigan BME department
- Previous position as VP of Academic Affairs
- Organize Ph.D. recruitment
- Plan social events including a college-wide 5K fun run for graduate students

Big Brothers Big Sisters of Washtenaw County 2014-2016

- Volunteer big sister and role model for high school stduent in need of female mentor

TAAL Indian Fusion Dance 2013-2015

- Competitive cultural dance team at the University of Michigan
- Placed 3rd at national competition held at Purdue University
- Travelled to additional competitions in Toronto, ON and Santa Barbara, CA

Kappa Phi Delta Sorority 2009-2013

- Member of local sorority at IIT
- Elected President for 2012 calendar year
- Past positions include Alumnae Relations and Sisterhood Chairs
- Active member of Alumnae Chapter

New Velocity Dance 2011-2013

- Choreographer and instructor for dance organization at IIT

Skills

Technical

- MATLAB
- MRI Physics, Pulse Sequence Programming
- Operation of GE MRI Systems
- Signal and Image Processing
- LaTeX Typesetting
- Convex Optimization
- SQL Server and Reporting Services

Spanish Language Certification

- B2 Advanced-Intermediate Level Dipoloma by the Institute of Cervantes, a division of the Ministry of Education, Culture, and Sport of the Spanish Government