Sydney N. Williams

Imaging Centre of Excellence (ICE)
Queen Elizabeth University Hospital
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EDUCATION

University of Michigan, Ann Arbor, MI
Ph.D., Biomedical Engineering, September 2018
Dissertation: Constrained and Spectral-Spatial RF Pulse Design for Magnetic Resonance Imaging
M.S.E., Electrical & Computer Engineering, December 2017
M.S.E., Biomedical Engineering, April 2015

Illinois Institute of Technology, Chicago, IL
B.S., Biomedical Engineering, May 2013 (*Summa Cum Laude*)

Universidad Politécnica de Madrid, Madrid, Spain
Visiting semester in telecommunications engineering with courses instructed in Spanish

RESEARCH EXPERIENCE

Postdoctoral Research Assistant — University of Glasgow
October 2018-Present — Glasgow, UK
Imaging Centre of Excellence (ICE)
Supervisor: Dr. David A. Porter

- Parallel transmit (pTx) excitation for magnetic resonance imaging (MRI)
- Optimization of 7 tesla MR neuroimaging
- Siemens MRI pulse sequence programming

Graduate Research Assistant — University of Michigan
September 2013-September 2018 — Ann Arbor, MI
fMRI Laboratory
Supervisors: Dr. Douglas C. Noll and Dr. Jeffrey A. Fessler

- Multi-dimensional radiofrequency (RF) pulse design
- Steady-state MRI sequences
- GE MRI pulse sequence programming

Undergraduate Research Assistant — DePaul University
June 2012-December 2012 — Chicago, IL
Medical Informatics Laboratory
Supervisors: Dr. Daniela Raicu and Dr. Jacob Furst

- NSF-funded Research Experience for Undergraduates (REU)
- Data mining and machine learning for CT image clasification
- Evaluation metrics for probabilistic multiclass classifiers.

TEACHING EXPERIENCE

The Physics of Medical Imaging — University of Glasgow
Spring 2020 — Glasgow, UK
Guest lecturer and exam writer for joint MSc Medical Physics and BSc Biomedical Engineering Course

- Lecture and exam questions on MRI Hardware

Music Signal Processing — University of Michigan
Fall 2015 — Ann Arbor, MI
Graduate student instructor for freshman undergraduate lab and lecture course
Course Instructor: Dr. Jeffrey A. Fessler

- Course topics: technical communications skills, signal sampling, continuous vs. discrete signals, Fourier/spectral analysis, and basic concepts of music theory

- Teaching tasks: directing program labs where students engaged in labs and projects, holding weekly officce hours, grading lab reports

Biomedical Engineering Lab University of Michigan
Winter/Spring 2015 Ann Arbor, MI
Graduate student instructor for third-year undergraduate lab and lecture course
Course Instructors: Dr. Dennis Claflin and Dr. Douglas C. Noll

- Course topics: electronic circuits, materials testing, cell culture, basic statistics, and experimental design
- Teaching tasks: organizing morning lab session, overseeing undergraduate instructor aide, grading lab reports, holding weekly office hours, and giving guest statistics lecture

Intro to Biomedical Engineering Illinois Institute of Technology
Fall 2012 Chicago, IL
Teaching assistant for freshman undergraduate lab and lecture course
Course Instructor: Dr. Bonnie Haferkamp

- Course topics: tissue engineering, neural engineering, and medical imaging
- Teaching tasks: developing experimental protocols, setting up laboratory experiments, and grading lab reports

Intro to Calculus Illinois Institute of Technology
Spring 2012 Chicago, IL
Teaching assistant for freshman undergraduate architecture students
Course Instructor: Dr. David Maslanka

- Course topics: limits, derivatives, integrals, and other calculus fundamentals
- Teaching tasks: grading worksheets, tutoring students, and holding exam reviews

Geometry for Architects Illinois Institute of Technology
Fall 2010 and Fall 2011 Chicago, IL
Teaching assistant for freshman undergraduate architecture students
Course Instructor: Dr. David Maslanka

- Course topics: basic geometry and proofs, pre-calculus, and trigonometry
- Teaching tasks: grading worksheets, tutoring students, and holding exam reviews

OTHER EXPERIENCE

Software Developer Intern Dialysis Clinic, Inc.
Summer 2013 Chicago, IL

- Developer on support team for the largest non-profit US dialysis company
- Solved user-reported problems via communication and technical skills such as SQL, Classic ASP, and report design with SQL Server Reporting Services (SSRS)

Private Tutor Varsity Tutors
2013 Chicago, IL

- Tutor for middle school, high school, and college students
- Calculus, Physics, Chemistry, ACT Math and Science, and Spanish Language

JOURNAL PAPERS

1. P. McElhinney*, **S. N. Williams***, S. Allwood-Spiers*, G. Paterson, J. E. Foster, D. A. Porter, G. Shajan, "Development of a dual-mode head coil for human brain imaging at 7 tesla", *In Preparation.*
2. **S. N. Williams**, J-F. Nielsen, J.A. Fessler, and D.C. Noll, "Slab-selective prewinding pulses for steady-state imaging", *In Preparation.*
3. **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.*, vol. 79(3), March 2018. doi: 10.1002/mrm.26794.

*denotes equal authorship

CONFERENCE PUBLICATIONS

1. **S. N. Williams**, S. Allwood-Spiers, P. McElhinney, Y. Tao, J. E. Foster, D. A. Porter, S. Gunamony, "First In Vivo Images from an In-House Parallel Transmit Coil for MRI at 7 Tesla", *Ann. Sci. Meet. Scot. Imag. Net. Plat. Sci. Exc.* (SINAPSE ASM), 2020, *To occur in June.*
2. **S. N. Williams***, S. Allwood-Spiers*, P. McElhinney, Y. Tao, J. E. Foster, D. A. Porter, S. Gunamony, "Validation and Safety Approval of a Dual-Mode Head Coil for pTx Applications In Vivo at 7 Tesla", *Proc. Int. Soc. Mag. Reson. Med.* (ISMRM), 2020, *To occur in August.*
3. **S. N. Williams**, P. McElhinney, S. Allwood-Spiers, Y. Tao, J. E. Foster, D. A. Porter, S. Gunamony, "Comparing the practical effects of VOP compressions for SAR monitoring at 7 T", *MN Workshop U.H.F. Im.*, 2019, Minneapolis, Minnesota, USA. Abstract.
4. G. Bruce, G. Keith, **S. Williams**, D. Porter, "The effect of B_1 variation on T_1 estimates at 7 tesla', *Proc. Brit. Chap. Int. Soc. Mag. Reson. Med.* (BC-ISMRM), 2019, Sheffield, England, UK. Abstract.
5. M. Gil, **S. Williams**, G. Keith, D. Porter, "The effect of B_1^+ inhomogeneity and slice proifle on spin-echo sequences at 7 tesla: computer simulation and experimental validation", *Proc. Brit. Chap. Int. Soc. Mag. Reson. Med.* (BC-ISMRM), 2019, Sheffield, England, UK. Abstract.
6. **S. N. Williams**, J-F. Nielsen, J.A. Fessler, and D.C. Noll, "A simple method for constrained optimal control RF pulse design", *Proc. Int. Soc. Mag. Reson. Med.* (ISMRM), 2019, Montreal, Canada. Abstract.
7. **S. N. Williams**, J-F. Nielsen, J.A. Fessler, and D.C. Noll, "Slab-selective spectral and spectral-spatial prewinding RF pulses", *Proc. Int. Soc. Mag. Reson. Med.* (ISMRM), 2018, Paris, France. Abstract.
8. **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.* (ESMRMB), 2017, Barcelona, Spain. E-poster.
9. **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.* (ISMRM), 2017, Honolulu, HI, USA. Abstract.
10. **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, USA.
11. **S. 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.* (ISMRM), 2015, Toronto, Canada. *Magna Cum Laude Award.* Abstract.
12. **S. Williams**, M. Harris, J. Furst, and D. Raicu, "Area under the distance threshold curve as an evaluation measure for probabilistic classifiers," *Proc. Mach. Learn. Data Min.* (MLDM), 2013, New York City, NY, USA. doi: 10.1007/978-3-642-39712-749.

PRESENTATIONS

1. "Parallel transmit (pTx) techniques for improved image quality", *Neuro-oncology ICE 7 T visit*, Glasgow, Scotland, UK, Oct. 2019.
2. "Initial investigation of a spokes slice-selective pTx RF pulse design for MRI at 7 tesla", *SINAPSE Annual Scientific Meeting*, Dundee, Scotland, UK, June 2019.
3. "Slab-selective spectral and spectral-spatial prewinding RF pulses", *Proc. Int. Soc. Mag. Reson. Med.*, Paris, France, June 2018.

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4. "Radio frequency pulse design for target magnetic resonance imaging applications", *Northwestern U. Biomed. Eng. Dept. Seminar*, Chicago, IL, Feb. 2018.
5. "Radio frequency pulse design for target magnetic resonance imaging applications", *UMich. Phys. Grad. Student Symposium*, Ann Arbor, MI, Aug. 2017.
6. "Exciting spins: radio frequency pulse design strategies for magnetic resonance imaging", *UMich. Biomed. Eng. Grad. Student Speaker Series*, Ann Arbor, MI, Aug. 2015.
7. "A spectral-spatial pulse for improved signal recovery in the small-tip fast recovery sequence", *Proc. Int. Soc. Mag. Reson. Med.*, Toronto, Canad, May 2015.

STUDENT SUPERVISION

1. **Iain Taylor**, Primary Supervisor
   University of Glasgow Medical Physics MSc Dissertation Research
   Currently supervising research on 7 tesla parallel transmit RF pulse design 2020
2. **George Bruce**, Secondary Supervisor
   University of Glasgow Medical Physics MSc Dissertation Research
   Thesis: "Optimization of 7 tesla MRI sequence parameters by measuring human brain relaxation times in vivo" 2019
3. **Matthew Gil**, Tertiary Supervisor
   University of Glasgow Medical Physics MSc Dissertation Research
   Thesis: "The effect of B1 inhomogeneity and slice profile on MRI pulse sequences at 7 tesla: computer simulation and experimental validation" 2019

AWARDS

Triumph Over Adversity Award
University of Michigan Rackham Merit Fellows Program 2017
Graduate Assistance in Areas of National Need Fellowship
University of Michigan Department of Biomedical Engineering 2014-2016
Outstanding Poster Award
In Vivo Magnetic Resonance Gordon Research Conference 2016
Magna Cum Laude Presenter's Award
International Society of Magnetic Resonance in Medicine (ISMRM) 2015
Honorable Mention of Graduate Research Fellowship
National Science Foundation (NSF) 2014
University of Michigan Graduate Fellowship
University of Michigan Department of Biomedical Engineering 2013-2014
3rd Place at ASAIO National Conference
American Society for Artificial Internal Organs Design Competition 2013
3rd place at MO-IL Regional Competition
St. Luis, MO Idea to Product Student Design Competition 2013
Illinois Institute of Technology Camras Scholar
Full-tuition academic scholarship 2009-2013
Orfalea Scholar
Private local scholarship from the San Luis Obispo Community Foundation 2009-2013

SERVICE/ AFFLIIATIONS

Eur. Society for Magnetic Resonance in Medicine and Bio. (ESMRMB)
Student member 2017-Present
International Society for Magnetic Resonance in Medicine (ISMRM)
Trainee Member 2014-Present
Graduate Society of Women Engineers (GradSWE)
Student member and elementary outreach team leader 2015-2017
University of Michigan Biomedical Engineering Graduate Student Council
Co-president leading academic, professional, and social events for the graduate students of the UM BME department 2014-2018
Big Brothers Big Sisters of Washtenaw County

Volunteer big sister for high school student 2014-2016

TAAL Indian Fusion Dance

Member of competitive University of Michigan cultural dance team 2013-2015

Biomedical Engineering Society (BMES)

Student member 2012-2013

Order of Omega Honors Greek Society

Member invited as top 3% of academic class 2012-2013

Tau Beta Pi

Member of national honors engineering society 2011-2013

Kappa Phi Delta

Member and elected president of local sorority at Illinois Inst. of Tech. 2009-2013

Spanish Language Certification

B2 Advanced-Intermediate Level Dipoloma by the Institute of Cervantes 2011