Sydney N. Williams

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EDUCATION

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

Illinois Institute of Technology, Chicago, IL, USA
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

Morro Bay High School, Morro Bay, CA, USA
High school diploma Jun. 2009 (*3rd in class with* 4.4 *GPA*)

EMPLOYMENT & POSTS

Lecturer — University of Glasgow, Glasgow, UK
Sep. 2022-Present
Imaging Centre of Excellence (ICE)
School of Psychology & Neuroscience

Postdoctoral Research Associate — University of Glasgow, Glasgow, UK
Oct. 2018-Sep. 2022
Imaging Centre of Excellence (ICE)
Supervisor: Dr. David A. Porter

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

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

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

RESEARCH & SCHOLARSHIP

Journal Publications

1. J. Herrler*, **S. N. Williams***, P. Liebig, C. R. Meixner, B. Ding, P. McElhinney, S. Allwood-Spiers, S. Gunamony, R. Gumbrecht, A. Maier, A. Dörfler, D. A. Porter, A. Nagel, "The effects of RF coils and SAR supervision strategies for clinically applicable non-selective parallel-transmit pulses at 7 tesla", *Mag. Reson. Med.*, 2022 (Accepted).
2. **S. N. Williams**, P. McElhinney, and S. Gunamony, "Ultra-High field MRI: parallel-transmit arrays and RF pulse design", *Phys. Med. Biol.*, 2022 (Invited Review). doi: 10.1088/1361-6560/aca4b7

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3. **S. N. Williams**, S. Allwood-Spiers*, P. McElhinney*, G. Paterson, J. Herrler, P. Liebig, A. M. Nagel, J. E. Foster, D. A. Porter, S. Gunamony, "A nested eight-channel transmit array with open-face concept for human brain imaging at 7 tesla", *Front. Phys.*, vol. 9, Jul. 2021. doi: 10.3389/fphy.2021.701330

4. **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), Mar. 2018. doi: 10.1002/mrm.26794.

Conference Publications

1. **S. N. Williams**, I. Dragonu, B. Ding, P. Liebig, D. A. Porter, "Parallel Tranmission (pTx) for Improved Multishot Diffusion Weighted Imaging", *Proc. Org. Hum. Brain Map.* (OHBM), 2022, Glasgow, Scotland, UK. Abstract. Short Presentation.

2. **S. N. Williams**, B. Ding, I. Dragonu, P. Liebig, D. A. Porter, "First Evaluation of External Development Sequences for 7T Parallel-Transmit MRI in a Self-Built Coil", *Ann. Sci. Meet. Scot. Imag. Net. Plat. Sci. Exc.* (SINAPSE ASM), 2022, Glasgow, Scotland, UK. *Best Presentation Award*. Abstract.

3. **S. N. Williams**, I. Dragonu, B. Ding, P. Liebig, D. A. Porter, "Simultaneous Multislice pTx for Readout-Segmented Diffusion Imaging at 7 T", *Proc. Int. Soc. Mag. Reson. Med.* (ISMRM), 2022, London, England, UK. Abstract. Short Presentation.

4. P. Liebig, J. Herrler, R. Tomi-Tricot, **S. N. Williams**, B. Ding-Yuan, M. Hlou, V. Chebrolu, F. Gadjimuradov, T. Hilbert, T. Kober, R. Gumbrecht, R. M. Heidemann, T. Benkert, C. Rodgers, D. A. Porter, I. Dragonu, A. Nagel, and S. Malik, "Generalized framework for homogeneous ultra-high-field brain imaging", *Proc. Int. Soc. Mag. Reson. Med.* (ISMRM), 2022, London, England, UK. Abstract.

5. B. Ding, **S. N. Williams**, I. Dragonu, P. Liebig, D. A. Porter, "Parallel transmission for 7T multi-short diffusion-weighted imaging", *Proc. Int. Soc. Mag. Reson. Med. Ultra-High Field Workshop* (ISMRM UHF Workshop), 2022, Lisbon, Portugal. Abstract.

6. **S. N. Williams**, J. Herrler, P. Liebig, P. McElhinney, S. Allwood-Spiers, J. E. Foster, S. Gunamony, A. M Nagel, D. A. Porter, "Comparing specific absorption rate (tissue heating) management methods for pTx MRI at 7 T", *Ann. Sci. Meet. Scot. Imag. Net. Plat. Sci. Exc.* (SINAPSE ASM), 2021, Virtual. *Best Poster Award* Poster.

7. **S. N. Williams**, J. Herrler, P. Liebig, P. McElhinney, S. Gunamony, A. M Nagel, D. A. Porter, "SAR management in pTx sequence design: the impact of electromagnetic-field-derived virtual observation points", *Proc. Int. Soc. Mag. Reson. Med.* (ISMRM), 2021, Virtual. Abstract.

8. **S. N. Williams**, S. Allwood-Spiers, P. McElhinney, Y. Tao, J. E. Foster, S. Gunamony, D. A. Porter, "Validation of SAR management procedure for dynamic pTx RF waveforms using a self-built coil at 7 tesla", *Proc. Int. Soc. Mag. Reson. Med.* (ISMRM), 2021, Virtual. *Magna Cum Laude Award* Abstract.

9. **S. N. Williams**, I. Dragonu, P. Liebig, D. A. Porter, "Multi-slice 2D pTx readout-segmented diffusion-weighted imaging using slice-by-slice B_1^+ shimming", *Proc. Int. Soc. Mag. Reson. Med.* (ISMRM), 2021, Virtual. Abstract.

10. S. Gunamony, R. Müller, P. McElhinney, **S. N. Williams**, N. Groß-Weege, N. Weiskopf, H. E. Möller, D. Feinberg, "A 16-channel transmit 96-channel receive head coil for NexGen 7T scanner", *Proc. Int. Soc. Mag. Reson. Med.* (ISMRM), 2021, Virtual. Abstract.

11. J. Herrler, **S. N. Williams**, P. Liebig, S. Gunamony, C. Meixner, A. Maier, A. Dörfler, D. A. Porter, A. M. Nagel, "Evaluating Universal and Fast Online Customized Pulses for parallel transmission using two different RF coils", *Proc. Int. Soc. Mag. Reson. Med.* (ISMRM), 2021, Virtual. Abstract.

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12. J. Herrler, P. Liebig, R. Gumbrecht, **S. N. Williams**, C. Meixner, A. Maier, A. M. Nagel, "Improved B0 mapping with universal parallel transmit pulses at 7 tesla", *Proc. Int. Soc. Mag. Reson. Med.* (ISMRM), 2021, Virtual. Abstract.

13. **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, Virtual. Abstract. Presentation.

14. **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, Virtual. *Best Poster Award*. Poster. Power Pitch.

15. S. Allwood-Spiers, P. McElhinney, **S. N. Williams**, Y. Tao, J. E. Foster, D. A. Porter, S. Gunamony, "Safety validation of a custom-built head coil for 7T human scanning", *Ann. Sci. Meet. Scot. Imag. Net. Plat. Sci. Exc.* (SINAPSE ASM), 2020, Virtual.

16. P. McElhinney, S. Allwood-Spiers, **S. N. Williams**, Y. Tao, J. E. Foster, D. A. Porter, S. Gunamony, "Numerical optimisation of an open-faced head coil design for MRI at 7 tesla", *Ann. Sci. Meet. Scot. Imag. Net. Plat. Sci. Exc.* (SINAPSE ASM), 2020, Virtual.

17. **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.

18. 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.

19. 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.

20. **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.

21. **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.

22. **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.

23. **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.

24. **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.

25. **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.

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26. **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.

Funding Award Generation

- **International Partnerships**, BBSRC **£28,275** Nov. 2022
  Project Title: Parallel Transmission (pTx) on A NextGen 7T Scanner
  Funded research visits to work with Dr. David Feinberg's group at the University of California Berkeley, Berkeley, CA, USA
- **Flexibility Talent Mobility Account**, BBSRC **£3,380** Nov. 2018
  Funded two-week research visit to work with collaborators at the Martinos Center, Massachusetts General Hospital (MGH)/Massachusetts Institute of Technology (MIT), Boston, MA, USA

Student Supervision

1. **Arizona (Rose) Huby**
   Primary Supervisor, University of Glasgow Jun.-Sep. 2022
   MSc Precision Medicine
   Thesis: "Analysis of parallel transmission for diffusion imaging at 7 tesla"
2. **Catherine Stephens**
   Co-Supervisor, University of Glasgow May.-Aug. 2021
   MSc Medical Physics
   Thesis: "Development of an improved computer model for magnetic resonance imaging at ultra-high field strength"
3. **Omar Salim**
   Co-Supervisor, University of Glasgow May.-Aug. 2021
   MSc Brain Sciences
   Thesis: "Using parallel transmit pulses to improve magnetic resonance neuroimaging at 7 tesla"
4. **Iain Taylor**
   Primary Supervisor, University of Glasgow May.-Aug. 2020
   MSc Medical Physics
   Thesis: "Design of generalizable parallel transmit (pTx) radiofrequency (RF) pulses for mitigating RF rield inhomogeneity of 7T brain MRI"
5. **George Bruce**, Co-Supervisor
   Co-Supervisor, University of Glasgow May.-Aug. 2019
   MSc Medical Physics
   Thesis: "Optimization of 7 tesla MRI sequence parameters by measuring human brain relaxation times in vivo"
6. **Matthew Gil**, Co-Supervisor
   Co-Supervisor, University of Glasgow May.-Aug. 2019
   MSc Medical Physics
   Thesis: "The effect of B1 inhomogeneity and slice profile on MRI pulse sequences at 7 tesla: computer simulation and experimental validation"

IMPACT

1. **Climate Action Network** Jun. 2022 - Present
   Member of newly founded sustainability group
   Develop and promote sustainable research practices within the School of Psychology & Neuroscience
2. **STEM Ambassador** Sep. 2020 - Present
   Member of STEM Ambassador volunteering program

3. **Ladies of Code Glasgow** Oct. 2018 - Present
   Dissemination of MRI research in the context of computer programming requirements for female software developers in Glasgow
   Talk: "RF Pulse Design for Ultra-High Field MRI"

4. **Images of Science** Mar. 2022
   Outdoor exhibition displaying 7T pTx MRI research at the Glasgow Science Centre

5. **Glasgow Explorathon** Sep. 2021
   Public engagement speaker for wider Glasgow community
   Talk: "What is MRI?", Presentation.

6. **Big Brothers Big Sisters of Washtenaw County** Aug. 2014 - Jun. 2016
   Volunteer big sister mentor for high school student

LEARNING & TEACHING PRACTICE

Courses Taught

1. **Cognitive Brain Imaging Methods**, University of Glasgow
   Lecturer and exam writer Winter 2022
   MSc Brain Sciences
   Created lectures on MRI physics and fMRI physiology and developed critical review final essay question

2. **The Physics of Medical Imaging**, University of Glasgow
   Lecturer and exam writer Spring 2020, 2021, 2022
   MSc Medical Physics, BSc Biomedical Engineering
   Provided lecture on MRI hardware and created entirely new lecture on 7 T MRI

3. **Music Signal Processing**, University of Michigan
   Graduate student instructor working with Dr. Jeffrey A. Fessler Fall 2015
   BSE Electrical Engineering
   Directed lab section and mentored students with final projects

4. **Biomedical Engineering Lab**, University of Michigan
   Graduate student instructor working with Dr. Dennis Claflin and Dr. Douglas C. Noll Winter/Spring 2015
   BSE Biomedical Engineering
   Directed lab section and delivered statistics lectures

5. **Intro to Biomedical Engineering**, Illinois Institute of Technology
   Teaching assistant working with Dr. Bonnie Haferkamp Fall 2012
   BSE Biomedical Engineering
   Developed experimental lab protocols and managed laboratory experiments

6. **Intro to Calculus**, Illinois Institute of Technology
   Teaching assistant working with Dr. David Maslanka Spring 2012
   BA Architecture
   Developed tutorials and led exam revision sessions

7. **Geometry for Architects**, Illinois Institute of Technology
   Teaching assistant working with Dr. David Maslanka Fall 2010, 2011
   BA Architecture
   Developed tutorials and led exam revision sessions

Miscellaneous Teaching

- **Private Tutor**, Chicago, IL
  Middle school, high school, and college students 2013
  Calculus, Physics, Chemistry, ACT Math and Science, and Spanish Language

LEADERSHIP, MANAGEMENT & ENGAGEMENT

1. **Inter. Soc. of Magnetic Resonance in Medicine (ISMRM)** 2015-Present
   - Lead professional society for MRI physics research
   - Organizer of the 2022 Ultra-High Field Workshop (Lisbon, Portugal)
   - Co-lead organizer of full-day 2022 UHF Pre-Workshop, "Custom RF Coils Parallel-Transmit for UHF" including inviting 6 world-leading expert speakers
   - Invited educational speaker at the 2020 and 2023 annual meetings for expertise on RF pulse design
   - Invited moderator for scientific sessions at the 2020, 2021, 2022, and 2023 annual meetings
   - Committee member of: High Field Study Group, Engineering Study Group, Safety Study Group, British and Irish Chapter, and Iberian Chapter
   - Trainee travel stipend recipient for 2015, 2017, 2018 annual meetings
2. **7 T Journal Club** 2019-Present
   - Created and manage recurring journal club at the Imaging Centre of Excellence (ICE), University of Glasgow
   - Organized participation from variety of disciplines including MRI physics, cognitive neuroscience, and clinical neurology
3. **Parallel Transmission (pTx) Project Meetings** Mar. 2020-Nov. 2021
   - Created and led bi-weekly virtual meeting to discuss pTx projects to maintain engagement with colleagues during the pandemic
   - Coordinated the meeting amongst University of Glasgow and NHS colleagues
4. **Uni. Michigan Biomed. Eng. Grad. Student Council** Jan. 2014-Jul. 2018
   - President of department graduate student representative body
   - Led academic, professional, and social events for biomedical engineering graduate students including but not limited to departmental seminars, graduate recruitment weekends, Midwest speaker exchange programs, and faculty and student mixers

ESTEEM

Invited Talks

1. "Introduction: Parallel Transmit Concepts", *Proc. Int. Soc. Mag. Reson. Med.*, Invited Educational Talk, Virtual, Jun. 2023.
2. "Parallel Transmission (pTx) on the Glasgow 7 T", *UK 7T Network*, Invited Talk, Virtual, Jan. 2023.
3. "Career Retrospective: SINAPSE, PhD, and More", *SINAPSE PhD Welcome Event*, Invited Talk, Perth, Scotland, Dec. 2022.
4. "Parallel Transmission (pTx) on the Glasgow 7 T", *CEA NeuroSpin*, Invited Talk, Paris-Saclay, France, Jun. 2022.
5. "First Evaluation of External Development Sequences for 7 T Parallel-Transmit MRI in a Self-Built RF Coil", *Ann. Sci. Meet. Scot. Imag. Net. Plat. Sci. Exc.* (SINAPSE ASM), Jun. 2022, Glasgow, Scotland, UK. *Best Talk Award*
6. "Simultaneous Multislice pTx for Readout-Segmented Diffusion Imaging at 7 T", *Proc. Int. Soc. Mag. Reson. Med.*, London, England, UK, May 2022.
7. "A Firsthand Account of 7T pTx MRI", *University Hospital Erlangen/FAU MRI Colloquium*, Invited Talk, Virtual, Nov. 2021.
8. "SAR management in pTx sequence design: the impact of electromagnetic-field-derived virtual observation points", *Proc. Int. Soc. Mag. Reson. Med.*, Virtual, May 2021.
9. "RF pulses and pTx for inner-volume and reduced FOV imaging", *ISMRM High Field Study Group Meeting*, Invited Talk, Virtual, Mar. 2021. Presentation.

10. "SAR management with custom 7 tesla pTx coils", *Siemens Healthineers EMEA Internal Meeting*, Invited Talk, Virtual, Feb. 2021.
11. "Applications of RF pulse designs: inner volume imaging, SMS, B1 shimming & pTx", *Proc. Int. Soc. Mag. Reson. Med.*, Invited Educational Talk, Virtual, Aug. 2020. Syllabus. Presentation.
12. "Parallel transmit (pTx) techniques for improved image quality", *Neuro-oncology ICE 7 T visit*, Glasgow, Scotland, UK, Oct. 2019.
13. "Initial investigation of a spokes slice-selective pTx RF pulse design for MRI at 7 tesla", *SINAPSE Annual Scientific Meeting*, Dundee, Scotland, UK, Jun. 2019.
14. "Slab-selective spectral and spectral-spatial prewinding RF pulses", *Proc. Int. Soc. Mag. Reson. Med.*, Paris, France, Jun. 2018.
15. "Radio frequency pulse design for target magnetic resonance imaging applications", *Northwestern U. Biomed. Eng. Dept. Seminar*, Chicago, IL, Feb. 2018.
16. "Radio frequency pulse design for target magnetic resonance imaging applications", *UMich. Phys. Grad. Student Symposium*, Ann Arbor, MI, Aug. 2017.
17. "Exciting spins: radio frequency pulse design strategies for magnetic resonance imaging", *UMich. Biomed. Eng. Grad. Student Speaker Series*, Ann Arbor, MI, Aug. 2015.
18. "A spectral-spatial pulse for improved signal recovery in the small-tip fast recovery sequence", *Proc. Int. Soc. Mag. Reson. Med.*, Toronto, Canada, May 2015.

Awards

1. **Best Presenter's Award**
   Scottish Imaging Net. Platform for Sci. Excellence (SINAPSE) 2020, 2021, 2022
2. **Magna Cum Laude Presenter's Award**
   International Society of Magnetic Resonance in Medicine (ISMRM) 2015, 2021
3. **Triumph Over Adversity Award**
   University of Michigan Rackham Merit Fellows Program 2017
4. **Graduate Assistance in Areas of National Need Fellowship**
   University of Michigan Department of Biomedical Engineering 2014-2016
5. **Outstanding Poster Award**
   In Vivo Magnetic Resonance Gordon Research Conference 2016
6. **Honorable Mention of Graduate Research Fellowship**
   National Science Foundation (NSF) 2014
7. **University of Michigan Graduate Fellowship**
   University of Michigan Department of Biomedical Engineering 2013-2014
8. **Illinois Institute of Technology Camras Scholar**
   Full-tuition academic scholarship 2009-2013
9. **Orfalea Scholar**
   Private local scholarship from the San Luis Obispo Community Foundation 2009-2013

Invited Publications & Reviews

1. **Invited Review Article**
   Invited to write a review paper on RF coils and parallel transmission MRI for *Physics in Medicine & Biology* 2022
2. **Magnetic Resonance in Medicine**
   Journal reviewer 2020-Present
   4 full paper reviews

3. **Inter. Soc. of Magnetic Resonance in Medicine**
   Conference abstract reviewer 2017-Present
   5 years, ≈ 125 reviews
4. **Nuclear Magnetic Resonance (NMR) in Biomedicine**
   Journal reviewer 2022-Present
   1 full paper review
5. **IEEE Inter. Conf. Acoustics, Speech, & Signal Processing**
   Conference paper reviewer 2021-Present
   3 years, 4 conference paper reviews

International Collaborations

1. **Siemens Healthcare GmbH**, Erlangen, Germany 2018-Present
   Collaborators: Patrick Liebig, Ph.D., Robin Heidemann, Ph.D., Rene Gumbrecht, Ph.D.
2. **Siemens Healthcare Ltd.**, Frimley, UK 2018-Present
   Collaborators: Iulius Dragonu, Ph.D., Belinda Ding, MSc.
3. **Massachusetts General Hospital/Massachusetts Institute of Technology**, Boston, MA, USA 2019-Present
   Collaborators: Bastien Guérin, Ph.D., Filiz Yetişir Ph.D., Lawrence Wald, Ph.D.
4. **University Hospital Erlangen**, Erlangen, Germany 2020-Present
   Collaborators: J*ü*rgen Herrler, MSc. and Armin Nagel, Ph.D.
5. **University of California Berkeley**, Berkeley, CA, USA 2020-Present
   Collaborators: David Feinberg, Ph.D., Alex Beckett Ph.D., An (Joseph) Vu, Ph.D.
6. **Leiden University Medical Center**, Leiden, Netherlands 2022-Present
   Collaborators: Wyger Brink, Ph.D.

Accreditation

1. **Instituto Cervantes** 2011-Present
   B2 level (advanced) certification in Spanish Language
2. **NHS Honorary Contract** 2022-Present
   Full operation control for MRI scanning and basic life support (BLS) certification
3. **Tau Beta Pi** 2013
   Honors engineering society
4. **Order of Omega** 2013
   Honors academic society for university fraternity and sorority members