

# Gavin R. Philips

Postdoctoral Fellow

Center for Inclusive Design and Engineering – Department of Bioengineering  
University of Colorado Denver | Anschutz Medical Campus  
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## Education

University of Florida	Ph.D., Electrical and Computer Engineering <i>Functional Connectivity Based Biomarkers for Evaluation and Guidance of BCI-Enabled Post-Stroke Motor Recovery</i>	2015
University of Wyoming	M.S., Electrical Engineering <i>Expanding Smart Wheelchair Technology for Users with Severe Disabilities</i>	2008
University of Wyoming	B.S., Computer Engineering and University Honors Program	2006

## Academic Appointments

- Postdoctoral Fellow 2018-present  
Assistive Technology Partners, Department of Bioengineering  
University of Colorado Denver | Anschutz Medical Campus
- Postdoctoral Fellow 2016-2018  
Institute for Cell Engineering, Department of Radiology and Radiological Science  
Johns Hopkins University School of Medicine
- Research Assistant 2012-2015  
Brain Rehabilitation Research Center of Excellence  
North Florida/South Georgia Veterans Affairs Medical Center
- Graduate Research Assistant 2011-2015  
Computational NeuroEngineering Lab, Department of Electrical and Computer Engineering  
University of Florida
- Professional Research Assistant 2009-2011  
Assistive Technology Partners, Department of Physical Medicine and Rehabilitation  
University of Colorado Denver
- Student Assistant III 2008-2009  
Assistive Technology Partners, Department of Physical Medicine and Rehabilitation  
University of Colorado Denver
- Graduate Research Assistant 2006-2008  
Department of Electrical and Computer Engineering  
University of Wyoming

## Teaching Record

### **Courses (Developed and Taught as Primary Instructor)**

- BIOE 4039/5039: Mechatronics and Embedded Systems, University of Colorado Denver | Anschutz Medical Campus. Spring 2020. Student rating of instructor effectiveness: 4.88/5.
- BIOE 5035: Mechatronics and Embedded Systems, University of Colorado Denver | Anschutz Medical Campus. Spring 2019. Student rating of instructor effectiveness: 4.75/5.

## **Courses (Teaching Assistant)**

- EEL 3003: Elements of Electrical Engineering, University of Florida. 2012
- EEL 3112: Circuits 2 (weekly recitation), University of Florida. 2011
- EE 4590/5590: Real Time Embedded Systems Lab, University of Wyoming. 2007
- EE 4390: Microprocessors Lab, University of Wyoming. 2006
- ES 1000: Orientation to Engineering Study, University of Wyoming. 2003

## **Mentoring**

- Ph.D. Research/Development Projects:
  - Cecilia Clark, Bioengineering, University of Colorado Denver
  - Madeline Blankenship, Bioengineering, University of Colorado Denver
  - Amy Zhang, Bioengineering, University of Colorado Denver
- Master's Research/Development Projects:
  - Kathryn Gray, Bioengineering, University of Colorado Denver
  - Jeffrey Wallace, Bioengineering, University of Colorado Denver
  - Peter Lawson, Bioengineering, University of Colorado Denver
  - Matthew Fleury, Bioengineering, University of Colorado Denver
  - Kurtis Pierson, Bioengineering, University of Colorado Denver
  - David Pak, Bioengineering, University of Colorado Denver
  - Samantha Thomas, Bioengineering, University of Colorado Denver
  - Joshua Carlin, Bioengineering, University of Colorado Denver
  - Tu Nguyen, Bioengineering, University of Colorado Denver
  - Anna Goldber-Richmeier, Bioengineering, University of Colorado Denver
  - Omar Hamid, Bioengineering, University of Colorado Denver
  - Brandon Lee, Bioengineering, University of Colorado Denver
  - Scotland Adkins, Bioengineering, University of Colorado Denver
  - Christian Padgett, Bioengineering, University of Colorado Denver
- Undergraduate Design Projects:
  - Shirin Sharif, Bioengineering, University of Colorado Denver
  - Soeren Orłowski, Computer Science and Engineering, University of Colorado Denver
  - Vinh Tran, Computer Science and Engineering, University of Colorado Denver
  - Kellen Mendenhall, Computer Science and Engineering, University of Colorado Denver
  - Benjamin Schwaller, Electrical and Computer Engineering, University of Florida
  - Dale Anthony Davis, Electrical and Computer Engineering, University of Florida
  - Six freshman design project teams, Bioengineering, University of Colorado Denver

## **Guest Lectures and Interactive Demonstrations**

- “Powered Mobility and Adapted Gaming,” Denver Metro Regional Science and Engineering Fair, University of Colorado Denver. 2020
- “Bioengineering and Assistive Technology,” Denver Public Schools Engineering Day, University of Colorado Denver. 2019
- “Bioengineering and Assistive Technology,” Denver Metro Regional Science and Engineering Fair, University of Colorado Denver. 2019

- “Bioengineering and Assistive Technology,” 2018 CU Denver STEAMposium, University of Colorado Denver. 2018
- “Controlling the World with Your Mind: Assistive Technology and Brain-Computer Interfaces,” HEAD Talks series, Department of Neurology, Johns Hopkins University. 2018
- “Controlling the World with Your Mind: Assistive Technology and Brain-Computer Interfaces,” Nerd Nite Baltimore. 2017
- “Electronic Aids to Daily Living,” Recurring guest lecture, Graduate School of Professional Psychology, University of Denver. 2009
- “Electronic Aids to Daily Living,” Guest lecture, CLSC 6281, Department of Physical Medicine and Rehabilitation, University of Colorado Denver. 2009
- “AbleGames,” Interactive demonstration, ATIA 2009 Chicago. 2009

## **Grants and Fellowships**

### **Awarded**

- University of Florida Graduate School Fellowship Award. 2011-2015
- Honorable Mention, National Science Foundation Graduate Research Fellowship. 2006
- National Science Foundation EPSCoR Undergraduate Research Grant (three terms). 2004-2005

### **Developed and Submitted**

- “Assistive technology to promote independence and community living of seniors with mild to moderate dementia (MMD)”
  - NIDILRR – Disability and Rehabilitation Research Projects (DRRP) Program: Assistive Technology to Promote Independence and Community Living (\$1.5 mil)
  - Role: Co-investigator
- “Multivariate sensing and real time feedback to prevent pressure injury in wheelchair users of diverse target populations”
  - NIDILRR – Disability and Rehabilitation Research Projects (DRRP) Program: Real Time Pressure Mapping to Reduce Risk of Pressure Ulcers (\$1.75 mil)
  - Role: Co-investigator
- “Rehabilitation Engineering Research Center (RERC) on rehabilitation for work and employment (ReWORK RERC)”
  - NIDILRR – RERC on Rehabilitation Strategies, Techniques, and Interventions (\$4.625 mil)
  - Role: Collaborating center / subrecipient
- “Optimization and validation of minimally invasive smart environment sensing to promote independence and privacy in community living for adults with cognitive disabilities”
  - NIDILRR – Field Initiated Projects Program (Research) (\$600k)
  - Role: Co-investigator
- “Inclusion of people with disabilities and aging adults through integrated charging, monitoring, and planning for smart electrically powered mobility devices (EPMDs)”
  - NSF – Smart & Connected Communities (S&CC) Integrative Research Grants (SCC-IRG Track 2) (\$1.5 mil)
  - Role: Collaborating center / subrecipient
- “Rehabilitation Engineering Research Center for Advancing Cognitive Technologies (RERC-ACT) IV”

- NIDILRR – RERC on Technologies to Enhance Independence and Community Living for People with Cognitive Impairments (\$4.625 mil)
- Role: Project co-PI

### **Honors and Awards**

- “Golden Hairball” Award for Most Innovative Research, 20<sup>th</sup> Annual Johns Hopkins University Division of Magnetic Resonance Research Retreat. 2017
- University of Florida Graduate School Fellowship (GSF). 2011
- Second Place, 45<sup>th</sup> Rocky Mountain Bioengineering Symposium Student Paper Competition. 2008
- Best Team Project, University of Wyoming Department of Electrical and Computer Engineering Senior Design Competition. 2006
- Inducted into Tau Beta Pi Engineering Honor Society. 2004
- First Place, University of Wyoming Freshman Engineering Design Challenge. 2001
- National Merit Scholarship. 2001

### **Committee and Service Responsibilities**

- Peer Reviewer:
  - Neurorehabilitation and Neural Repair
  - Journal of NeuroEngineering and Rehabilitation
  - IEEE Transactions on Neural Systems and Rehabilitation Engineering
  - IEEE Transactions on Computational Intelligence and AI in Games
  - The Gerontologist
- Prospective PhD Student Interviewer/Evaluator, Department of Bioengineering, University of Colorado Denver | Anschutz Medical Campus. 2019
- Ablegames Technology Coordinator, Assistive Technology Partners, Department of Physical Medicine and Rehabilitation, University of Colorado Denver. 2009-2011
- STEMpalooza Interactive Demo Coordinator, Assistive Technology Partners, Department of Physical Medicine and Rehabilitation, University of Colorado Denver. 2008-2011
- Orientation Leader, University of Wyoming. 2005
- Teaching Assistant, University of Wyoming Engineering Summer Program for high school students. 2004

### **Licensure and Board Certification**

- Registered Engineer-In-Training, Wyoming State Board of Registration for Professional Engineers and Professional Land Surveyors. 2006

### **Additional Training**

- IEEE Brain Neurotechnology Entrepreneurship Workshop, IEEE Brain Initiative, Arizona State University. 2019
- BIOE 5420 Rehabilitation and Assistive Technology, Cathy Bodine, Department of Bioengineering, University of Colorado Denver | Anschutz Medical Campus. 2018

- NCAN Inaugural Summer Course, Jonathan Wolpaw, National Center for Adaptive Neurotechnologies, Wadsworth Center, New York State Department of Health. 2016
- Wheelchair Seating for Postural Control and Function, Kelly Waugh, Assistive Technology Partners, Department of Physical Medicine and Rehabilitation, University of Colorado Denver. 2009
- Advanced Assistive Technology Training Program, Assistive Technology Partners, Department of Physical Medicine and Rehabilitation, University of Colorado Denver. 2008
- CLSC 6281 Assistive Technology: Engineering and Biotechnology: Principles & Emerging Technologies, Greg McGrew, Assistive Technology Partners, Department of Physical Medicine and Rehabilitation, University of Colorado Denver. 2008

## **Publications**

### **Journal and Full-Length Conference Papers**

1. **G. R. Philips**, C. Clark, J. Wallace, C. Coopmans, Z. Pantic, C. Bodine, "User-Centered Design, Evaluation, and Refinement of a Wireless Power Wheelchair Charging System," (*submitted*).
2. C. Coopmans, M. Le, A. Azad, Z. Pantic, **G. R. Philips**, "Enabling Autonomous and Wirelessly-Charging Power Wheelchairs," (*manuscript in preparation*).
3. **G. R. Philips**, S. Van Vuuren, C. Bodine, "User Testing and Evaluation of a Context-Aware Prompting System as Vocational Support for People with Cognitive Disabilities," (*manuscript in preparation*).
4. C. Clark, **G. R. Philips**, B. Burne, V. Haggett, C. Bodine, "Study Design and Therapeutic Benefit with Ecological Validity: HCI for Children with Cerebral Palsy," (*submitted*).
5. **G. R. Philips**, B. Gleich, G. A. Paredes-Juarez, A. Antonelli, M. Magnani, J. W. M. Bulte, "Magnetic Manipulation of Blood Conductivity with Superparamagnetic Iron Oxide-Loaded Erythrocytes," *ACS Applied Materials & Interfaces*, 11, Mar. 2019, pp. 11194-11201.
6. **G. R. Philips**, J. J. Daly, and J. C. Principe, "Topographical Measures of Functional Connectivity as Biomarkers for Post-Stroke Motor Recovery," *Journal of NeuroEngineering and Rehabilitation*, 14:67, Jul. 2017.
7. **G. R. Philips**, M. Kh. Hazrati, J. J. Daly, and J. C. Principe, "Addressing Low Frequency Movement Artifacts in EEG Signals Recorded During Center-Out Reaching Tasks," *IEEE Intl. Conf. on Engineering in Medicine and Biology*, Aug. 2014, pp. 6497-6500.
8. C. A. Loza, **G. R. Philips**, M. Kh. Hazrati, J. J. Daly, and J. C. Principe, "Classification of Hand Movement Direction Based on EEG High-Gamma Activity," *IEEE Intl. Conf. on Engineering in Medicine and Biology*, Aug. 2014, pp. 6509-6512.
9. **G. R. Philips**, C. H. G. Wright, and S. F. Barrett, "Expanding Smart Wheelchair Technology for Users with Severe Disabilities," *ISA Biomedical Sciences Instrumentation*, 44, Apr. 2008, pp. 47-52.
10. **G. R. Philips**, A. A. Catellier, S. F. Barrett, and C. H. G. Wright, "Electrooculogram Wheelchair Control," *ISA Biomedical Sciences Instrumentation*, 43, Apr. 2007, pp. 164-169.

### **Conference Presentations and Other Works**

1. **G. R. Philips**, B. Gleich, G. A. Paredes-Juarez, A. Antonelli, M. Magnani, J. W. M. Bulte, "Virtual Brain Electrode (VIBE): Selective Magnetic Manipulation of Blood Conductivity,"

*proceedings of the 9<sup>th</sup> International Workshop on Magnetic Particle Imaging*, New York, NY, Mar. 2019.

2. **G. R. Philips**, B. Gleich, G.A. Paredes-Juarez, A. Antonelli, M. Magnani, J. W. M. Bulte, "Virtual Brain Electrode (VIBE) for Imaging Neuronal Activity," poster presented at the 4<sup>th</sup> Annual BRAIN Initiative Investigators Meeting, Bethesda, MD, Apr. 2018.
3. **G. R. Philips**, B. Gleich, A. Antonelli, M. Magnani, J. W. M. Bulte, "Virtual Brain Electrode (VIBE) for Imaging Neuronal Activity," poster presented at the 3<sup>rd</sup> Annual BRAIN Initiative Investigators Meeting, Bethesda, MD, Dec. 2016.
4. **G. R. Philips**, J. J. Daly, and J. C. Principe, "Quantification of Functional Connectivity using Topographical Volume for Brain-Computer Interface Enabled Stroke Rehabilitation," poster presented at the 2<sup>nd</sup> international conference on Real-time Functional Imaging and Neurofeedback, Gainesville, FL, Feb. 2015.
5. **G. R. Philips**, "How to Program the Flash Memory of a Minidragon+ (9s12dp256 Based Evaluation Board)," *University of Wyoming Technical Manual*, 2007.