

Matthew Anthony Schiefer, Ph.D.

4342 Groveland Rd • University Heights, OH 44118 • (216) 702-4072 • matthew.schiefer@case.edu

EDUCATION

- 08/01-05/09 **Case Western Reserve University** *Cleveland, OH*
Ph.D., Biomedical Engineering (May 2009)
M.S., Biomedical Engineering (May 2003)
GPA: 3.83
- 08/96-05/01 **Vanderbilt University** *Nashville, TN*
Engineer In Training (EIT) Certification
B.E., Biomedical Engineering
Magna Cum Laude, GPA: 3.65
- 02/99-11/99 **Murdoch University** *Perth, Western Australia*
Study Abroad Program
GPA: 4.0

RESEARCH AND PROFESSIONAL EXPERIENCE

- 05/09-Present **Post-Doctoral Scholar – Case Western Reserve University** *Cleveland, OH*
Mentor: Dr. Ronald Triolo

Research – Design & analysis of a sciatic nerve neuroprosthesis

- Modeling Neural Response to Electrical Stimulation
 - 3D Finite Element Method (FEM) model development (Matlab, Ansoft Maxwell)
 - Neural simulations (Matlab, Neuron)
 - Biomechanical Modeling (OpenSIMM)
- Intraoperative EMG acquisition and analysis during neural stimulation
 - EMG acquisition, analysis, and graphical user interface (GUI) development (Matlab)
 - Stimulator control (xPC Target, Simulink)

- 12/03-05/09 **Graduate Research Assistant – Case Western Reserve University** *Cleveland, OH*
Mentor: Dr. Dustin Tyler

Dissertation Research – “Optimized design of neural interfaces for clinical neuroprostheses: anatomically-based modeling and intraoperative evaluation”

- 3D FEM model development (AutoCAD, Ansoft Maxwell)
- Neural stimulation computer simulations and analysis (Matlab, Neuron, Excel, S+)
- Distributed quasi-parallel computing (Ohio Supercomputer Center)
- Human biological signal (EMG) acquisition, filtering, and processing (Cambridge Electronics Design (CED) Amplifiers, National Instruments DAQ Boards, Function Generators, Matlab)
- Intraoperative human nerve stimulation with a computer-controlled nerve cuff electrode
- Software development and data acquisition (Matlab)
- Interacting with surgeons, nurses, therapists, engineers and Regulatory Affairs personnel
- Experimental equipment specification, design, implementation, and troubleshooting

Assisting Researcher – Intraoperative evaluation of a spiral nerve cuff electrode for use in a lower extremity neuroprosthesis

- Assisting with experimental setup, data collection, and analysis
- Interacting with surgeons, nurses, therapists, and engineers

Assisting Researcher – Phase I clinical trial evaluating an implanted neuroprosthesis to reduce aspiration in post-stroke patients

- Assisting with experimental setup and data collection
- Interacting with patients, clinicians, nurses, therapists, and engineers

Tutor – Individual and small group help sessions

- 3D Finite Element Method (FEM) model development (Ansoft Maxwell)

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- Neural stimulation computer simulations and analysis (Matlab, Neuron)

Network Administrator – LNNIS network developer and administrator

- Secure wiki and Network Accessible Storage (NAS) (HTML, JavaScript, CSS, WAMP, PM Wiki)
- Real time network computer usage (Windows NetMon, VBScript)
- Computer specification, design, building, and maintenance

01/02-11/03 **Graduate Research Assistant – Case Western Reserve University** **Cleveland, OH**

Mentor: Dr. Warren Grill

Masters Research – “A model of excitation of retinal ganglion cells during extracellular epiretinal stimulation”

- Neural Stimulation Computer Simulations and Analysis (Matlab, Neuron, Excel, Minitab)

01/02-11/03 **Undergraduate Research – Vanderbilt University** **Nashville, TN**

Mentor: Dr. Duco Jansen

Senior Design – “Computerized targeting of an ablative laser beam for brain tumor resection”

- Data processing (Matlab)
- Free Electron Laser (FEL) beam control (LabView)

07/99-11/99 **Undergraduate Research – Murdoch University** **Perth, Western Australia**

Independent Researcher – “Electron microscopic examination of drug effects on protozoa”

- Sterile cell culture and drug dosing
- Cell fixing and staining
- Ultra-thin sample preparation
- Transmission electron microscopy and photography

AWARDS AND HONORS

- 3rd Place, Research ShowCASE 2009.
- Nominated to the American Association for the Advancement of Science (AAAS) – Science Program for Excellence in Science by Pamela Davis, Dean of the Case Western Reserve University School of Medicine.
- The Cleveland Clinic Foundation Award for Best Oral Presentation, 2008 Biomedical Graduate Student Symposium
- Poster Award, 2008 Biomedical Engineering Research ShowCASE
- Cover Article, IEEE Trans Neur Sys Rehab Eng, 16(2), April 2008.
- Ohio 3rd Frontier Innovation Incentives in Technology (IIT) Graduate Student Fellowship 2006, 2007
- 1st Place, Intramural Singles Racquetball Tournament 2007
- 1st Place, Robbie Robinson Neural Engineering and Rehabilitation Day Conference 2007
- Honorable Mention for graduate research, 2007 Research ShowCASE
- Nominated for the Lenore Kola Award for exemplary service to the graduate student community
- 2nd Place, Intramural Singles Racquetball Tournament 2006
- 2nd Place, Robbie Robinson Neural Engineering and Rehabilitation Day Conference: 2005, 2006
- Marcus Singer Award for Best Poster Presentation, 2005 Biomedical Graduate Student Symposium
- Case Western Reserve Univ. Graduate Studies Endowment-Sponsored Mentorship Program Recipient 2003
- Biomedical Engineering Society Student Travel Award for attending the 2003 annual conference
- 3rd Place, Robbie Robinson Neural Engineering and Rehabilitation Day Conference Poster Contest, 2003
- The Department of Education GAANN Fellowship
- The 2001 Rita Schaffer Biomedical Engineering Society Award
- The 2001 Engineering Dean’s Award for Outstanding Service
- The 2001 Thomas G. Arnold Prize for Best Senior Biomedical Engineering Design
- The 2001 John T. and Lizzie Allen McGill Award, awarded to an upperclassman who is academically accomplished, has demonstrated qualities of leadership, and whose efforts have led to an increased understanding of other student’s needs and a more civil campus atmosphere.
- Dean’s List 1996-2001

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PATENTS

- W. M. Grill and **M. A. Schiefer**, “System and Method for Selective Retinal Stimulation,” USPTO Application #: 20070244523, Class: 607054000, Provisional Application No. 60/744,749. Accepted October 2007.

TEACHING

- “Fundamentals of Finite Element Method (FEM) Modeling & a Crash-Course in Ansoft,” EBME 401: Bioelectric Phenomena, Fall 2009.

PEER-REVIEWED PUBLICATIONS

- **M. A. Schiefer**, K. H. Polasek, R. G. C. J. Pinault, R. J. Triolo, D. J. Tyler, “Selective stimulation of the common human femoral nerve with a Flat Interface Nerve Electrode,” *J Neur Eng*, Submitted, 2009.
- K. H. Polasek, **M. A. Schiefer**, G. C. J. Pinault, R. J. Triolo, D. J. Tyler, “Intraoperative evaluation of the spiral nerve cuff electrode on the femoral nerve trunk,” *J Neur Eng*, In Press, 2009.
- Y. Grinberg, **M. A. Schiefer**, D. J. Tyler, K. J. Gustafson, “Fascicular perineurium thickness, size, and position affect model predictions of neural excitation,” *IEEE Trans Neur Sys Rehab Eng*, 16: 572-581, 2008.
- **M. A. Schiefer**, R. J. Triolo, D. J. Tyler, “A model of selective activation of the femoral nerve with a flat interface nerve electrode for a lower extremity neuroprosthesis,” *IEEE Trans Neur Sys Rehab Eng*, 16: 195-204, 2008.
- **M. A. Schiefer**, W. M. Grill, “Sites of neuronal excitation by epiretinal electrical stimulation,” *IEEE Trans Neur Sys Rehab Eng*, 14: 5-13, 2006.
- D. C. Lee, A. L. Jensen, **M. A. Schiefer**, C. W. Morgan, W. M. Grill, “Structural mechanisms to produce differential dendritic gains,” *Brain Research*, 1033: 117-127, 2005.

ABSTRACTS AND PUBLIC PRESENTATIONS

- E. Peterson, N. Brill, **M. A. Schiefer**, D. J. Tyler (2009) “Advancement of a Computationally Efficient Method to Predict Neural Activation with Nerve Cuff Stimulation,” *Department of Biomedical Engineering 40th Anniversary* (Poster)
- **M. A. Schiefer**, K. H. Polasek, R. J. Triolo, G. C. Pinault, D. J. Tyler (2009) “Optimized Design of Neural Interfaces for Femoral Nerve Clinical Neuroprostheses: Anatomically-Based Modeling and Intraoperative Evaluation,” *31st Annual International IEEE EMBS Conference* (Poster)
- **M. A. Schiefer**, K. H. Polasek, R. J. Triolo, G. C. Pinault, D. J. Tyler (2009) “Optimized Design of Neural Interfaces for Femoral Nerve Clinical Neuroprostheses: Anatomically-Based Modeling and Intraoperative Evaluation,” *Research ShowCASE* (Poster)
- **M. A. Schiefer** (2009) “Optimized Design of neural Interfaces for Femoral Nerve Clinical Neuroprostheses: Anatomically-Based Modeling and Intraoperative Evaluation,” *Dissertation Defense*, March 16, 2009.
- **M. A. Schiefer**, K. H. Polasek, G. C. Pinault, R. J. Triolo, D. J. Tyler (2008) “Intraoperative Evaluation of the Flat Interface Nerve Electrode for Selective Recruitment of Anterior Thigh Muscles in Humans,” *38th Annual NIH Neural Interfaces Conference* (Poster)
- Y. Grinberg, **M. A. Schiefer**, D. J. Tyler, K. J. Gustafson (2008) “Physiologic Fascicle Size and Perineurial Thickness Affect Predictions of Stimulation Selectivity,” *38th Annual NIH Neural Prosthesis Workshop* (Poster)
- **M. A. Schiefer**, K. H. Polasek, G. C. Pinault, R. J. Triolo, D. J. Tyler (2008) “Intraoperative Evaluation of the Flat Interface Nerve Electrode for Selective Recruitment of Anterior Thigh Muscles in Humans,” *31st Annual Biomedical Graduate Student Symposium* (Platform)
- **M. A. Schiefer**, K. H. Polasek, G. C. Pinault, R. J. Triolo, D. J. Tyler (2008) “Intraoperative Evaluation of the Flat Interface Nerve Electrode for Selective Recruitment of Anterior Thigh Muscles in Humans,” *Ohio State University Workshop on Restoration of Movement Via Peripheral Nerve Stimulation* (Poster)
- Y. Grinberg, **M. A. Schiefer**, D. J. Tyler, K. J. Gustafson (2008) “Physiologic Fascicle Size and Perineurial Thickness Affect Predictions of Stimulation Selectivity,” *Ohio State University Workshop on Restoration of Movement Via Peripheral Nerve Stimulation* (Poster)
- **M. A. Schiefer**, K. H. Polasek, G. C. Pinault, R. J. Triolo, D. J. Tyler (2008) “Intraoperative Evaluation of the Flat Interface Nerve Electrode for Selective Recruitment of Anterior Thigh Muscles in Humans,” *Research ShowCASE* (Poster)

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- Y. Grinberg, **M. A. Schiefer**, D. J. Tyler, K. J. Gustafson (2008) “Physiologic Fascicle Size and Perineurial Thickness Affect Predictions of Stimulation Selectivity,” *Research ShowCASE* (Poster)
- Y. Grinberg, **M. A. Schiefer**, D. J. Tyler, K. J. Gustafson (2007) “Physiologic Fascicle Size and Perineurial Thickness Affect Stimulation Selectivity,” *BMES Annual Conference* (Poster)
- **M. A. Schiefer**, K. H. Polasek, G. C. Pinault, R. J. Triolo, D. J. Tyler (2007) “Models of Selective Stimulation with and Intraoperative Testing of a Flat Interface Nerve Electrode,” *Neural Engineering and Rehabilitation Lectures* (Poster)
- Y. Grinberg, **M. A. Schiefer**, D. J. Tyler, K. J. Gustafson (2007) “Effects of Fascicle Size and Perineurial Thickness on Stimulation Selectivity,” *Neural Engineering and Rehabilitation Lectures* (Poster)
- K. H. Polasek, **M. A. Schiefer**, G. C. Pinault, R. J. Triolo, D. J. Tyler (2007) “Intraoperative Evaluation of the Spiral Nerve Cuff Electrode for a Standing Neuroprosthesis,” *Neural Engineering and Rehabilitation Lectures* (Poster)
- **M. A. Schiefer**, K. H. Polasek, G. C. Pinault, R. J. Triolo, D. J. Tyler (2007) “Intraoperative Evaluation of the First Flat Interface Nerve Electrode for a Standing Neuroprosthesis: A Case Report,” *3rd International IEEE/EMBS Conference on Neural Engineering* (Platform)
- K. H. Polasek, **M. A. Schiefer**, G. C. Pinault, R. J. Triolo, D. J. Tyler (2007) “Intraoperative Evaluation of the Spiral Nerve Cuff Electrode for a Standing Neuroprosthesis,” *3rd International IEEE/EMBS Conference on Neural Engineering* (Poster)
- **M. A. Schiefer**, R. J. Triolo, G. C. Pinault, D. J. Tyler (2007) “Models of Selective Stimulation with and Intraoperative Testing of a Flat Interface Nerve Electrode,” *Research ShowCASE* (Poster)
- K. H. Polasek, **M. A. Schiefer**, G. C. Pinault, R. J. Triolo, D. J. Tyler (2007) “Intraoperative Evaluation of the Spiral Nerve Cuff Electrode for a Standing Neuroprosthesis,” *Research ShowCASE* (Poster)
- **M. A. Schiefer**, R. J. Triolo, D. J. Tyler (2006) “Models of Selective Stimulation with a Flat Interface Nerve Electrode for Standing Neuroprosthetic Systems,” *28th International IEEE/EMBS Conference* (Platform)
- **M. A. Schiefer**, R. J. Triolo, D. J. Tyler (2006) “Selectively Stimulating the Human Femoral Nerve with a Flat Interface Nerve Electrode,” *37th Annual NIH Neural Prosthesis Workshop* (Poster)
- **M. A. Schiefer**, R. J. Triolo, D. J. Tyler (2006) “Models of Selective Stimulation with a Flat Interface Nerve Electrode for Standing Neuroprosthetic Systems,” *Neural Engineering and Rehabilitation Lectures* (Poster)
- **M. A. Schiefer**, R. J. Triolo, D. J. Tyler (2006) “Models of Selective Stimulation with a Flat Interface Nerve Electrode for Standing Neuroprosthetic Systems,” *29th Annual Biomedical Graduate Student Symposium* (Poster)
- **M. A. Schiefer**, R. J. Triolo, D. J. Tyler (2006) “Models of Selective Stimulation with a Flat Interface Nerve Electrode for Standing Neuroprosthetic Systems,” *Research ShowCASE* (Poster)
- **M. A. Schiefer**, K. J. Gustafson, R. J. Triolo, D.M. Durand, D. J. Tyler (2005) “Modeling Selective Stimulation with a FINE for Standing Neuroprosthetics,” *BME Research ShowCASE* (Poster)
- **M. A. Schiefer**, R. J. Triolo, D.M. Durand, D. J. Tyler (2005) “Modeling Selective Stimulation with a FINE for Standing Neuroprosthetics,” *BMES Annual Conference* (Poster)
- **M. A. Schiefer**, R. J. Triolo, D.M. Durand, D. J. Tyler (2005) “Modeling Selective Stimulation with a FINE for Standing Neuroprosthetics,” *Neural Engineering and Rehabilitation Day* (Poster)
- **M. A. Schiefer**, R. J. Triolo, D.M. Durand, D. J. Tyler (2005) “Modeling Selective Stimulation with a FINE for Standing Neuroprosthetics,” *10th Annual Conference of the International Functional Electrical Stimulation Society* (Poster)
- **M. A. Schiefer**, K. J. Gustafson, R. J. Triolo, D.M. Durand, D. J. Tyler (2005) “Models of Selective Stimulation with a Flat Interface Nerve Electrode for Standing Neuroprosthetic Systems,” *28th Annual Biomedical Graduate Student Symposium* (Poster)
- **M. A. Schiefer**, R. J. Triolo, D.M. Durand, D. J. Tyler (2005) “Models of Selective Stimulation with a Flat Interface Nerve Electrode for Standing Neuroprosthetic Systems,” *ShowCASE* (Poster)
- **M. A. Schiefer**, R. J. Triolo, D.M. Durand, D. J. Tyler (2005) “Modeling Selective Stimulation with a Flat Interface Nerve Electrode for Standing Neuroprosthetic Systems,” *2nd International IEEE/EMBS Conference on Neural Engineering* (Platform)
- **M. A. Schiefer**, R. J. Triolo, D.M. Durand, D. J. Tyler (2004) “Optimized Contact Location on a Flat Interface Nerve-Cuff Electrode for Use in Standing Neuroprosthetic Systems,” *35th Annual NIH Neural Prosthesis Workshop* (Poster)
- **M. A. Schiefer**, R. J. Triolo, K. J. Gustafson, D. J. Tyler (2004) “Optimized Contact Location on a Flat Interface Nerve-Cuff Electrode for Use in Standing Neuroprosthetic Systems,” *Neural Engineering and Rehabilitation Day* (Poster)
- **M. A. Schiefer**, W.M. Grill (2003) “A model of Excitation Sites During Epiretinal Electrical Stimulation,” *34th Annual NIH Neural Prosthesis Workshop* (Poster)

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- **M. A. Schiefer**, W.M. Grill (2003) “Modeling Excitation Sites of Retinal Ganglion Cells During Epiretinal Electrical Stimulation,” *BMES Annual Conference*. (Platform)
- **M. A. Schiefer**, W.M. Grill (2003) “A model of Excitation Sites During Epiretinal Electrical Stimulation,” *Neural Engineering and Rehabilitation Day* (Poster)
- **M. A. Schiefer**, W.M. Grill (2002) “Modeling Excitation Sites During Epiretinal Electrical Stimulation,” *33rd Annual NIH Neural Prosthesis Workshop* (Poster)
- **M. A. Schiefer**, W.M. Grill (2002) “Modeling Excitation Sites During Epiretinal Electrical Stimulation,” *Applied Neural Control Research Day* (Poster)

INTERNAL PRESENTATIONS

- “Optimized Design of Neural Interfaces for Femoral Nerve Clinical Neuroprostheses: Intraoperative Evaluation of an Anatomically-Based Model-Driven Design,” MetroHealth Functional Electrical Stimulation Weekly Meeting, Apr. 2009.
- “Modeling and Intraoperative Evaluation of the Flat Interface Nerve Electrode (FINE) for Selective Recruitment of Anterior Thigh Muscles in Humans,” Neural Engineering Center Weekly Meeting, Aug. 2008.
- “Selectively Stimulating the Femoral Nerve with a Flat Interface Nerve Electrode: Modeling & Intraoperative Evaluation,” VA Motion Studies Laboratory Weekly Meeting, Feb. 2008.
- “Models of Selective Stimulation with and Intraoperative Testing of a Flat Interface Nerve Electrode,” Neural Engineering Center Weekly Meeting, June 2007.
- “Models of Selective Stimulation with a Flat Interface Nerve Electrode (FINE) for Standing Neuroprosthetic Systems,” Department of Biomedical Engineering Weekly Meeting, Sept. 2006.
- “Models of Selective Stimulation with a Flat Interface Nerve Electrode (FINE) for Standing Neuroprosthetic Systems,” VA Motion Studies Laboratory Weekly Meeting, Sept. 2006.
- “Models of Selective Stimulation with a Flat Interface Nerve Electrode for Standing Neuroprosthetic Systems,” Laboratory for Neuromimetic and Neural Integrated Systems Meeting, Mar. 2006.
- “Development of an Optimized Nerve Cuff Electrode for Selective Activation of Fascicles of the Human Femoral Nerve,” MetroHealth Functional Electrical Stimulation Weekly Meeting, Mar. 2006.
- “Development of an Optimized Nerve Cuff Electrode for Selective Activation of Fascicles of the Human Femoral Nerve,” Neural Engineering Center Weekly Meeting, Feb. 2006.
- “Models of Selective Stimulation with a Flat Interface Nerve Electrode for Standing Neuroprosthetic Systems,” VA Motion Studies Laboratory Weekly Meeting, Oct. 2005.
- “Modeling Selective Stimulation with a FINE for Standing Neuroprosthetics,” Neural Engineering Center Weekly Meeting, Apr. 2005.
- “Modeling Selective Stimulation with a FINE for Standing Neuroprosthetics,” MetroHealth Functional Electrical Stimulation Weekly Meeting, Jan. 2005.

STUDENT LEADERSHIP

Case Western Reserve University

Cleveland, OH

- 04/07-05/07 **President’s Taskforce on Security and Safety** – Member
- 08/06-05/07 **Board of Trustees’ Academic Affairs and Student Life Committee** – Member
- 08/06-05/07 **Provost’s Graduate and Professional Student Experience Committee** – Member
- 05/05-05/07 **Graduate Student Grievance & Academic Integrity Boards** – Board Member and Juror
- 08/05-05/07 **Faculty Senate** – Member (voting), Member of the Committee on Information Resources, Member of the Committee on Graduate Studies
- 05/04-06/08 **Graduate Student Senate (GSS)** – President, Biomedical Engineering Senator, School of Engineering Representative, Corresponding Secretary, Organizations and Allocations Committee Chair, Diekhoff Award Committee Chair, Vfund Award Committee Chair, Preparing Future Faculty/Professionals (PFF/PFP) Committee Chair, At-Large Executive Officer
- 04/02-05/07 **Biomedical Engineering Graduate Student Association (GSA)** – President, Vice President, Committee Chair, Senator

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Vanderbilt University

Nashville, TN

05/01-05/09 **Engineering Alumni Council (EAC)** – Young Alumni Class Representative, Member
04/00-04/01 **Engineering Council** – Committee Chair
08/98-05/01 **V-Squared Engineering Mentoring Program** – President, Mentor

PROFESSIONAL SOCIETIES: The Institute of Electrical and Electronics Engineers, Engineering in Medicine and Biology Society (IEEE – EMBS), The Biomedical Engineering Society (BMES), Tau Beta Pi (Engineering Honor Society), The Order of the Engineer

INTERESTS

- Racquetball, Tennis, Bowling, Tae Kwon Do, Photography, Hiking, Camping, Traveling, Web Page Design, Piano, Gourmet Cooking

References available upon request.