Program Day 1 & Day 2 Thursday/Friday Aug. 17/18 (draft Monday, August 7, 2023)

Conference Zoom Link: https://us06web.zoom.us/j/86961326195

3rd Annual Brain & Human Body Modeling (BHBM) Conference
(Online format with in-person participation)
August 17-18, 2023

A.A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Charlestown MA

Support of the A.A. Martinos Center for Biomedical Imaging, Novocure, Inc., and the National Institute of Mental Health (NIMH), is greatly acknowledged.

Recordings of all talks will be posted on the Conference website at Massachusetts General Hospital with distribution through the network of Harvard Medical School

Program as of August 7, 2023

Presentation schedule (presentation times have been corrected to accommodate different time zones):
All review presentations: from 20 to 30 min (including ~4-5 min for questions)
All research presentations: from 10 to 20 min (including ~3-5 min for questions)

Note all times given below are Eastern Standard Time (EST), USA

All presentations from students (including post doctorate and part-time students) are eligible for student competition 2023 (the student must be the first, presenting author). A monetary award ($1,000, 2x$500, and 2x$300) and an award plaque will be mailed to the winners within a month after the end of the conference.

Names of the authors eligible for the student competition (27 authors) are underlined

Conference Zoom Link: https://us06web.zoom.us/j/86961326195

Conference-based publications are accepted for a Special Edition of Physics in Medicine and Biology:

2023 BHBM Conference Organizers:
Kyoko Fujimoto, kyoko.fujimoto@ge.com, Gregory M. Noetscher, gregn@wpi.edu, Konstantin Weise, kweise@cbs.mpg.de, Thomas R. Knösche, knoesche@cbs.mpg.de, Sofia R. Fernandes, srffernandes@fc.ul.pt, Zhi-De Deng, zhi-de.deng@nih.gov, Hanbing Lu, luha@intra.nida.nih.gov, Aapo R. Nummenmaa, nummenma@nmr.mgh.harvard.edu, Sergey N. Makaroff, makarov@wpi.edu
**Opening Session**

*Thursday Aug. 17, 2023, Online Presentations*

**Chair: Kyoko Fujimoto (GE Healthcare), kyoko.fujimoto@ge.com**

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<tbody>
<tr>
<td>1</td>
<td>Bruce Rosen <a href="mailto:brosen@mgh.harvard.edu">brosen@mgh.harvard.edu</a></td>
<td>Opening remarks</td>
<td>Athinoula A. Martinos Ctr. for Biomedical Imaging, Massachusetts General Hospital, Boston MA USA</td>
<td>8:05 AM – 8:15 AM</td>
</tr>
<tr>
<td>2</td>
<td>Jean King <a href="mailto:jaking@wpi.edu">jaking@wpi.edu</a></td>
<td>Neurotechnology Suite at WPI</td>
<td>Dean in the School of Arts and Sciences, Worcester Polytechnic Institute, Worcester MA USA</td>
<td>8:15 AM – 8:30 AM</td>
</tr>
<tr>
<td>3</td>
<td>Yvonne Bennett <a href="mailto:yvonne.bennett@nih.gov">yvonne.bennett@nih.gov</a></td>
<td>BRAIN Initiative Sensors Program and other recent NIMH initiatives</td>
<td>NIMH Office of Technology Development and Coordination National Institutes of Health</td>
<td>8:30 AM – 8:45 AM</td>
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- Questions to presenters, coffee break

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**Session I: New Modeling Methods and Pipelines**

*Thursday Aug. 17, 2023, In person and online presentations*

**Chair: Gregory Noetscher (US ARMY DEVCOM-SC and WPI), gregory.m.noetscher.civ@army.mil**

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<tr>
<td>4</td>
<td>Fariba Karimi¹², Taylor H. Newton¹*, Bryn Lloyd¹, Javier Garcia Ordonez¹, Melanie Steiner¹, AmirAli Farokhniae¹, Jan Paul Triebkorn³, Huifang Wang³, Viktor Jirsa³, Niels Kuster¹², and Esra Neufeld¹ <a href="mailto:newton@itis.swis">newton@itis.swis</a></td>
<td>A pipeline for personalized modeling of electrical neuromodulation: From image segmentation to brain activity</td>
<td>¹Foundation for Research on Information Technologies in Society (IT’IS), Zurich, Switzerland ²Dept. of Information Technology and Electrical Engineering, ETH Zurich, Zurich, Switzerland ³Institut de Neurosciences des Systèmes, Marseille, France</td>
<td>9:00 AM – 9:30 AM</td>
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<td>5</td>
<td>Konstantin Weise¹², Kristoffer H. Madsen³⁴, Thomas R. Knösche², Anders Korshøj¹, Axel Thielscher⁴⁵ <a href="mailto:kweise@cbs.mpg.de">kweise@cbs.mpg.de</a></td>
<td>A flexible optimization framework for transcranial electric stimulation, temporal interference stimulation and tumor treating fields</td>
<td>¹Dept. of Clinical Medicine, Aarhus Univ., Aarhus, Denmark ²M&amp;D Group Brain Networks, Max Planck Inst. for Human Cognitive and Brain Sciences, Leipzig, Germany ³Technical Univ. of Denmark, Section for Cognitive Systems, Dept. of Applied Mathematics and Computer Science, Kongens Lyngby, Denmark ⁴Danish Research Centre for Magnetic Resonance, Centre for Functional and Diagnostic Imaging and Research, Copenhagen Univ. Hospital Amager and Hvidovre, Denmark ⁵Technical Univ. of Denmark, Section for Magnetic Resonance, Dept. of Health Technology, Kongens Lyngby, Denmark</td>
<td>9:30 AM – 10:00 AM</td>
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<td>10:00 AM – 10:15 AM</td>
<td>Questions to presenters, coffee break</td>
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| 10:15 AM – 10:35 AM | Tim Erdbrügger¹, Andreas Westhoff¹, Malte Höltershinken¹, Jan-Ole Radecke², Yvonne Buschermöhle¹, Alena Buyx⁴, Fabrice Wallois⁵, Sampsa Pursiainen⁶, Joachim Gross¹, Rebekka Lencer⁴,³, Christian Engwer⁷ and Carsten Wolters¹ tim.erdbruegger@uni-muenster.de  
CutFEM forward modeling for MEG source analysis ¹Inst. for Biomagnetism and Biosignalanalysis, Univ. of Münster, Münster, Germany ²Dept. of Psychiatry and Psychotherapy, Univ. of Lübeck, Lübeck, Germany ³Center for Brain, Behavior and Metabolism (CBBM), Univ. of Lübeck, Lübeck, Germany ⁴Inst. of History and Ethics in Medicine, Technical Univ. of Munich, Germany ⁵Institut National de la Sante’ et de la Recherche Me´dicale, Univ. of Picardie Jules Verne, France ⁶Computing Sciences Unit, Faculty of Information Technology and Communication Sciences, Tampere Univ., Finland ⁷Inst. for Analysis and Numerics, Univ. of Münster, Münster, Germany |
| 10:35 AM – 10:55 AM | Questions to presenters, lunch (US)/dinner (Europe) 10:55 AM – 11:50 AM |
| 10:55 AM – 11:50 AM | William Wartman¹,²*, Manas Rachh³, Vishwanath Iyer², Leslie Greengard⁴, Gregory Noetscher¹, Mohammad Daneshzand¹, Matti Hämäläinen⁶, Jyri P. Ahveninen⁶, Konstantin Weise⁷, Tommi Raji³, Aapo Nummenmaa³, Sergey Makaroff¹* snmakaroff@wpi.edu  
Boundary element fast multipole method for mesoscale and multiscale brain modeling ¹Electrical and Computer Eng., Worcester Polytechnic Inst., Worcester MA USA ²The MathWorks, Inc., Natick, USA ³Center for Computational Mathematics, Flatiron Inst., New York, USA ⁴Dept. of Mathematics, Courant Inst. of Mathematical Sciences, New York Univ., USA ⁵Athinoula A. Martinos Ctr. for Biomedical Imaging, Massachusetts General Hospital, Boston USA ⁶Dept. of Neuroscience and Biomedical Engineering, School of Science, Aalto Univ., Espoo, Finland ⁷M&D Group Brain Networks, Max Planck Inst. for Human Cognitive and Brain Sciences, Leipzig, Germany |
### Session II: New Modeling Methods and Targets Including Cellular Modeling - TMS

**Thursday Aug. 17, 2023, In person and online presentations**

**Chairs:** Thomas Knösche (Max Planck Inst.), knoesche@cbs.mpg.de, Aapo Nummenmaa (Massachusetts General Hospital), nummenmaa@nmr.mgh.harvard.edu

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<td>8</td>
<td>Thomas Knösche, Ole Numssen, Gesa Hartwigsen, Konstantin Weise <a href="mailto:knoesche@cbs.mpg.de">knoesche@cbs.mpg.de</a></td>
<td>Smart TMS Mapping – Novel Approaches to Mapping and Modeling</td>
<td>Max Planck Inst. for Human Cognitive and Brain Sciences, Leipzig, Germany</td>
<td>11:50 AM – 12:10 PM</td>
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<td>9</td>
<td>Nahian Ibn Hasan, Dezhi Wang, Luis J. Gomez <a href="mailto:ljgomez@purdue.edu">ljgomez@purdue.edu</a></td>
<td>Application of Fast E-Field Solvers in Developing Individualized Optimal Transcranial Magnetic Stimulation</td>
<td>Elmore Family School of Electrical and Computer Engineering Purdue Univ., West Lafayette USA</td>
<td>12:10 PM – 12:30 PM</td>
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<td>10</td>
<td>Mohammad Daneshzand <a href="mailto:mdaneshzand@mgh.harvard.edu">mdaneshzand@mgh.harvard.edu</a></td>
<td>Assessment of modular multichannel TMS array combined with EMG and EEG</td>
<td>Athinoula A. Martins Ctr. for Biomedical Imaging, Massachusetts General Hospital, Boston MA USA</td>
<td>12:30 PM – 12:50 PM</td>
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<tr>
<td>11</td>
<td>Luis Gomez¹, Hao Zhang², Johann Guilleminot³ <a href="mailto:ljgomez@purdue.edu">ljgomez@purdue.edu</a></td>
<td>Uncertainty quantification of TMS simulations considering MRI segmentation errors</td>
<td>¹Dept. of Electrical and Computer Engineering, Purdue Univ., West Lafayette USA ²Dept. of Civil and Environmental Eng., Duke Univ., Durham USA ³Dept. of Civil and Environmental Engineering, Duke Univ., Durham USA</td>
<td>12:50 PM – 13:10 PM</td>
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<tr>
<td>12</td>
<td>Aaron Miller, Thomas R. Knösche, Konstantin Weise <a href="mailto:miller@cbs.mpg.de">miller@cbs.mpg.de</a></td>
<td>A neural mass model of TMS induced I-waves in the primary motor cortex</td>
<td>Max Planck Inst. for Human Cognitive and Brain Sciences, Leipzig, Germany</td>
<td>13:10 PM – 13:30 PM</td>
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Questions to presenters, coffee break

### Session III: New Modeling Methods and Targets – Spinal cord stimulation and novel stimulation targets

**Thursday Aug. 17, 2023, In person and online presentations**

**Chair:** Sofia Rita Fernandes (U Lisbon), srferandes@fc.ul.pt, Zhi-De Deng (NIH/NIMH), zhi-de.deng@nih.gov

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<td>13</td>
<td>Laureen Wegert¹, Alexander Hunold¹², Marek Ziolkowski¹, Tim Kalla¹, Irene Lange¹, Jens Haueisen¹ <a href="mailto:laureen.wegert@tu-ilmenau.de">laureen.wegert@tu-ilmenau.de</a></td>
<td>Comparison of phrenic nerve stimulation set-ups using an anatomically detailed volume conductor model of the neck</td>
<td>¹Inst. of Biomedical Engineering and Informatics, Faculty of Computer Sciences and Automation, Technische Universität Ilmenau, Ilmenau, Germany</td>
<td>13:40 PM – 14:00 PM</td>
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### Modelling challenges in non-invasive spinal stimulation: perspectives on current state-of-the-art

Sophia Rita Fernandes  
`srcfernandes@fc.ul.pt`

Instituto de Biofisica e Engenharia Biomédica, Faculdade de Ciências, Universidade de Lisboa, Portugal  
14:00 PM – 14:20 PM

### Magnetic stimulation of the cochlear with a microcoil and work towards a next-generation cochlear implant

Jae-Ik Lee, Shelley Fried,  
`jlee275@275@mgh.harvard.edu`

Neurosurgery  
Massachusetts General Hospital, Boston MA USA  
14:20 PM – 14:40 PM

### Questions to presenters, coffee break

14:40 PM – 14:50 PM

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**Session IV: Practical aspects of TMS modeling**

*Thursday Aug. 17, 2023, In person and online presentations*

*Chairs: Ravi Hadimani (Virginia Commonwealth University), rhadimani@vcu.edu, Lucia Navarro de Lara (Martinos Center), lnavarrodelara@mgh.harvard.edu*

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| 16 | Lucia Isabel Navarro de Lara  
`lnavarrodelara@mgh.harvard.edu` | Interaction between TMS and MRI | Athinoula A. Martinos Ctr. for Biomedical Imaging, Massachusetts General Hospital | 14:50 PM – 15:10 PM |
| 17 | Mohannad Tashli¹, Aryan Mhaskar¹,², George Weistroffer³, Deepak Kumbhare⁴, Mark S. Baron⁵,⁶,⁷, Ravi L. Hadimani¹,³,⁸  
`tashlims@vcu.edu` | Innovative transcranial magnetic stimulation coil designs for small animals utilizing multi-magnetic materials for enhanced E-field focality | ¹Dept. of Mechanical and Nuclear Engineering, Virginia Commonwealth Univ., Richmond, VA USA.  
²Ctr. for Biomedical Sciences, M. E. Godwin High School, Richmond, VA USA  
³Dept. of Biomedical Engineering, Virginia Commonwealth Univ., Richmond VA, USA.  
⁴Dept. of Neurosurgery, Louisiana State Univ. Health Center, Shreveport, Louisiana, USA  
⁵McGuire Research Inst., Hunter Holmes McGuire VA Medical Center, Richmond, VA, USA.  
⁶Southeast Parkinson’s Disease Research, Education and Clinical Center, Hunter Holmes McGuire Veterans Affairs Medical Center, Richmond, VA, USA.  
⁷Dept. of Neurology, Virginia Commonwealth Univ., Richmond, VA, USA.  
⁸Dept. of Mechanical and Nuclear Engineering, Virginia Commonwealth University | 15:10 PM – 15:25 PM |
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<th>Session</th>
<th>Speaker(s)</th>
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<tr>
<td>18</td>
<td>Wesley Lohr</td>
<td>Anatomically and conductively accurate rat head phantoms for transcranial magnetic stimulation</td>
<td>Virginia Commonwealth Univ., Richmond, VA, USA.</td>
<td>15:25 PM – 15:40 PM</td>
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<td>19</td>
<td>Shih-Cheng Chien, Christian Röse, Peng Wang, Helmut Schmidt, Thomas R. Knösche, Konstantin Weise</td>
<td>A biological model of spinal and peripheral motor pathways for TMS-induced MEPs</td>
<td>1(^{\text{ Inst. of Computer Science, Czech Academy of Sciences, Prague, Czech Republic}}) 2(^{\text{ Max Planck Inst. for Human Cognitive and Brain Sciences, Leipzig, Germany}}) 3(^{\text{ Inst. of Psychology, Univ. of Greifswald, Greifswald, Germany}})</td>
<td>15:40 PM – 15:55 PM</td>
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<td>20</td>
<td>Maria Nazarova</td>
<td>Stimulation of Cortical Spinal Tract during Cerebellar TMS</td>
<td>Athinoula A. Martinos Ctr. for Biomedical Imaging, Massachusetts General Hospital</td>
<td>15:55 PM – 16:10 PM</td>
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<td>21</td>
<td>Mehmet A. Ozdemir, Onan Guren, Mouhsin M. Shaﬁ, Recep A. Ozdemir</td>
<td>Prediction of intermittent theta burst stimulation response using machine learning</td>
<td>1(^{\text{ Berenson-Allen Center for Noninvasive Brain Stimulation, Dept. of Neurology, Beth Israel Deaconess Medical Center, Boston, MA, United States of America}}) 2(^{\text{ Dept. of Neurology, Harvard Medical School, Boston, MA, USA}}) 3(^{\text{ Dept. of Biomedical Engineering, Izmir Katip Celebi Univ., Izmir, Turkey}})</td>
<td>16:10 PM – 16:25 PM</td>
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<tr>
<td>22</td>
<td>Leah Morales</td>
<td>TMS coil design with fast multipole method</td>
<td>ECE Dept., Worcester Polytechnic Inst., Worcester MA USA</td>
<td>16:25 PM – 16:40 PM</td>
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<tr>
<td>23</td>
<td>Aapo Nummenmaa</td>
<td>What exactly are we modeling? – A virtual tour of TMS Core Lab, Athinoula A. Martinos Ctr. for Biomedical Imaging</td>
<td>Athinoula A. Martinos Ctr. for Biomedical Imaging, Massachusetts General Hospital, Boston MA USA</td>
<td>16:40 PM – 17:10 PM</td>
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<td>Questions to presenters, coffee break</td>
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<td>17:10 PM – 17:20 PM</td>
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**Conference dinner:** Meet at 17:30 PM at the ferry terminal
### Session V: MEG Practice and MEG Modeling

**Friday Aug. 18, 2023, In person and online presentations**

**Chairs:** Padma Sundaram (MGH), padma@nmr.mgh.harvard.edu, Hermann Kutschka (MPI), hermann.kutschka@cbs.mpg.de

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| 24 | Burkhard Maess, Hermann Kutschka  
maess@cbs.mpg.de  
hermann.kutschka@cbs.mpg.de | Virtual tour of MEG OPM facility at Max Planck  
MEG Lab, MEG Group Outstation, Max Planck Inst. for Human Cognitive and Brain Sciences, Leipzig, Germany | 7:00 AM – 7:20 AM |
| 25 | Padma Sundaram, Mainak Jas  
padma@nmr.mgh.harvard.edu | Setup of a room temperature MEG system at the Martinos Center  
Athinoula A. Martinos Ctr. for Biomedical Imaging, Massachusetts General Hospital, Boston MA USA | 7:20 AM – 7:35 AM |
| 26 | Mainak Jas  
mjas@mgh.harvard.edu | Forward calculations for OPM MEG  
Athinoula A. Martinos Ctr. for Biomedical Imaging, Massachusetts General Hospital, Boston MA USA | 7:35 AM – 7:45 AM |
| 27 | Tepppei Matsubara, Padma Sundaram  
tmatsubara@mgh.harvard.edu | Forward calculations for cerebellar MEG in epilepsy  
Athinoula A. Martinos Ctr. for Biomedical Imaging, Massachusetts General Hospital, Boston MA USA | 7:45 AM – 7:55 AM |

Questions to presenters, coffee break. Please consider asking more detailed questions offline.

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### Session VI: Cellular Level Based Modeling

**Friday Aug. 18, 2023, In person and online presentations**

**Chairs:** Hanbing Lu (NIDA), luha@intra.nida.nih.gov, Luis Gomez (Purdue University)  
ljgomez@purdue.edu

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| 28 | Konstantin Weise¹, Torge Worbs¹,², Benjamin Kolloch¹, Victor H. Souza¹, Aurélien Tristan Jaquier², Werner Van Geit², Axel Thielscher¹,², Thomas R. Knösche¹  
¹Max Planck Inst. for Human Cognitive and Brain Sciences, Leipzig, Germany  
²Danish Research Centre for Magnetic Resonance, Copenhagen Univ. Hospital Hvidovre, Denmark | Directional sensitivity of cortical neurons towards TMS induced electric fields | 8:00 AM – 8:17 AM |
| 29 | Hanbing Lu, Hieu Nguyen, Charlotte Li, Samantha Hoffman, Yihong Yang  
luha@intra.nida.nih.gov | What neuronal elements are stimulated by TMS? Simulations and Experiments on Awake rats  
National Inst. on Drug Abuse (NIDA), NIH USA | 8:17 AM – 8:34 AM |
| 30 | P. Sundaram  
padma@nmr.mgh.harvard.edu | Cellular mechanisms of TMS in cerebellum  
Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Boston MA USA | 8:34 AM – 8:51 AM |
| 31 | David M. Czerwonky, Luis J. Gomez  
dezercwony@purdue.edu  
ljgomez@purdue.edu | Computational E-field dosimetry with in-tissue neuron analysis using a boundary element approach  
Purdue Univ., West Lafayette IN, USA | 8:51 AM – 9:08 AM |
**Session VII: (Micro) Vascular Stimulation and Modeling**  
*Friday Aug. 18, 2023, In person and online presentations*

**Chair: Jonathan Polimeni (MGH), jrpolimeni@mgh.harvard.edu**

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<tr>
<td>33</td>
<td>Marom Bikson</td>
<td>Neuro-vascular modulation: what a new mechanism suggests about how brain stimulation works and how to interpret hemodynamic imaging?</td>
<td>The City College of New York of CUNY, New York USA</td>
<td>9:30 AM – 10 AM</td>
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<tr>
<td>34</td>
<td>Grant Hartung</td>
<td>Modeling basis of fMRI: Modeling susceptibility-caused variations of B0 in microvascular networks</td>
<td>Athinoula A. Martinos Ctr. for Biomedical Imaging, Massachusetts General Hospital, Boston MA USA</td>
<td>10:00 AM – 10:20 AM</td>
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Questions to presenters, coffee break

**Session VIII: tDCS Modeling**  
*Friday Aug. 18, 2023, In person and online presentations*

**Chair: Benjamin C. Nephew (WPI), bnephew@wpi.edu**

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| 35 | Vasco Marques da Silva¹ ² ³, Alexandre Andrade¹, Sofia Rita Fernandes¹ ³, Hugo Alexandre Ferreira¹ | Targeted tDCS in sensorimotor networks: A functional connectivity study | ¹Instituto de Biofísica e Engenharia Biomédica, Faculdade de Ciências, Universidade de Lisboa, Lisbon, Portugal  
²Iberchem, S.A., P.I. Oeste, Alcantarilla, Murcia, España  
³Instituto de Fisiologia, Instituto de Medicina Molecular, Universidade de Lisboa, Lisbon, Portugal | 10:30 AM – 10:50 AM |
| 36 | Pablo Franco-Rosado¹ ² ³, M. Amparo Callejón² ³, Javier Reina-Tosina³, Laura M. Roa³, Juan F Martin-Rodriguez¹ ² ³, Pablo Mir¹ ² ³ | Dose and inter-subject variability analysis for anodal tDCS stimulation over motor cortical network | ¹Unidad de Trastornos del Movimiento, Servicio de Neurología y Neurofisiología Clínica, Instituto de Biomedicina de Sevilla, Hospital Universitario Virgen del Rocío/CSIC/Universidad de Sevilla, Seville, Spain  
²Centro de Investigación Biomédica en Red sobre Enfermedades Neurodegenerativas, Madrid, Spain  
³Grupo de Ingeniería Biomédica, Escuela Técnica Superior de Ingeniería, Seville, Spain | 10:50 AM – 11:10 AM |
### Session IX: Development and Assessment of Modeling Methods

*Friday Aug. 18, 2023, In person and online presentations*

Chair: Manas Rachh (Ctr. for Comp. Mathematics, Flatiron Institute, NYC),

[mrachh@flatironinstitute.org](mailto:mrachh@flatironinstitute.org)

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| 37 | William A Wartman¹,², Konstantin Weise³,⁴, Manas Rach⁵, Leah Morales¹, Zhi-De Deng⁶, Aapo Nummenmaa⁷, Sergey N Makaroff⁷ | An Adaptive H-Refinement Method for the Boundary Element Fast Multipole Method for Quasi-static Electromagnetic Modeling | ¹ECE Dept., Worcester Polytechnic Inst., Worcester, MA USA  
²The MathWorks, Inc., Natick, MA USA  
³Max Planck Inst. for Human Cognitive and Brain Sciences, Leipzig, Germany  
⁴Dept. of Clinical Medicine, Aarhus Univ., Aarhus, Denmark  
⁵Center for Computational Mathematics, Flatiron Inst., New York, NY USA  
⁶Computational Neurostimulation Research Program, Noninvasive Neuromodulation Unit, Experimental Therapeutics & Pathophysiology Branch, National Inst. of Mental Health Intramural Research Program, National Institutes of Health, Bethesda, MD, USA  
⁷Athinoula A. Martinos Ctr. for Biomedical Imaging, Massachusetts General Hospital, Boston, MA USA |
| 38 | Mathias Davids mathias.davids@mgh.harvard.edu | New Huygens surface-based modeling approach to peripheral nerve stimulation | Athinoula A. Martinos Ctr. for Biomedical Imaging, Massachusetts General Hospital, Boston, MA USA |
| 39 | Yvonne Buschermöhl¹,², Malte Höltershinken¹, Tim Erdbrügger¹, Jan-Ole Radecke³,⁴, Andreas Sprenger⁴,⁵,⁶, Till R. Schneider⁷, Rebekka Lencer²,³,⁴,⁸, Joachim Gross¹,², Carsten H. Wolters¹,² yvonne.buschermohle@uni-muenster.de | Comparing the performance of beamformer algorithms in estimating orientations of neural sources | ¹Inst. for Biomagnetism and Biosignalanalysis, Univ. of Münster, Münster, Germany.  
²Otto Creutzfeldt Center for Cognitive and Behavioral Neuroscience, Univ. of Münster, Münster, Germany  
³Dept. of Psychiatry and Psychotherapy, Univ. of Lübeck, Lübeck, Germany  
⁴Center of Brain, Behavior and Metabolism, Univ. of Lübeck, Lübeck, Germany  
⁵Dept. of Neurology, Univ. of Lübeck, Lübeck, Germany |

Questions to presenters, coffee break. Please consider asking more detailed questions offline.

11:10 AM – 11:15 AM
### Session X: WPI Research: Analyzing Functional and Structural MRI Data for Rehabilitation and Diagnosis

**Friday Aug. 18, 2023, In person and online presentations**

**Chair:** Padma Sundaram (Massachusetts General Hospital), [padma@nmr.mgh.harvard.edu](mailto:padma@nmr.mgh.harvard.edu), Grant Hartung (Massachusetts General Hospital), [ghartung@mgh.harvard.edu](mailto:ghartung@mgh.harvard.edu)

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<th>Title</th>
<th>Organization</th>
<th>EST (USA)</th>
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<tbody>
<tr>
<td>41</td>
<td>Tess B. Meier, Christopher J. Nycz, Gregory S. Fischer</td>
<td>Studying brain activation during exoskeleton-facilitated hand movement using fMRI at the intersection of assistance and rehabilitation</td>
<td>Robotics Engineering, Worcester Polytechnic Inst. USA</td>
<td>13:00 PM – 13:20 PM</td>
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<td>42</td>
<td>Justin J. Polcari¹, Ryan J. Cali², Benjamin C. Nephew¹, Frances Saadeh³, Eric Loucks³, Jean A. King¹</td>
<td>A mindfulness intervention for hypertension alters resting state functional connectivity networks</td>
<td>¹Dept. of Biology and Biotechnology, Worcester Polytechnic Inst., Worcester, Massachusetts USA ²Dept. of Neurology, Massachusetts General Hospital and Harvard Medical School, Boston, Massachusetts USA ³Dept. of Behavioral and Social Sciences, Brown Univ., Providence, Rhode Island USA</td>
<td>13:20 PM – 13:40 PM</td>
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<tr>
<td>43</td>
<td>Sarah Semy, Senbao Lu, Benjamin Nephew</td>
<td>Enhancing timely detection of Alzheimer’s dementia and mild cognitive impairment using a deep learning model and structural MRIs</td>
<td>Worcester Polytechnic Inst., Worcester, Massachusetts USA</td>
<td>13:40 PM – 14:00 PM</td>
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### Session XI: Modeling Transcranial Focused Ultrasound

**Chair:** Mohammad Daneshzand (Massachusetts General Hospital), [mdaneshzand@mgh.harvard.edu](mailto:mdaneshzand@mgh.harvard.edu)

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| 44 | Thiago P. Maffei Dardis¹, Bastien Guérin²,³ [tmaffeidardis@mgh.harvard.edu](mailto:tmaffeidardis@mgh.harvard.edu) | A general deep learning ultrasound solver for real-time tFUS navigation in individualized skull models | ¹ESPCI Paris, PSL Research University, Paris, France  
²A. A. Martinos Center for Biomedical Imaging, Department of Radiology, Massachusetts General Hospital, Charlestown, Massachusetts, USA  
³Harvard Medical School, Boston, Massachusetts, USA | 14:10 PM – 14:30 PM |
| 45 | Evgenii Kim [ekim73@bwh.harvard.edu](mailto:ekim73@bwh.harvard.edu)              | Localized Drug Plasma Protein Unbinding through Transcranial Focused Ultrasound | Brigham and Women's Hospital, Boston MA USA                                                      | 14:30 PM – 14:50 PM |

### Session XII: High-Frequency Modeling

**Chair:** James Brown, Micro Systems Engineering, Inc., [james.brown@biotronik.com](mailto:james.brown@biotronik.com), Gregory Noetscher (US ARMY DEVCOM-SC and WPI), [gregory.m.noetscher.civ@army.mil](mailto:gregory.m.noetscher.civ@army.mil)

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<tr>
<td>46</td>
<td>James E. Brown, Paul J. Stadnik, Jeffrey A. Von Arx, Dirk Muessig, <a href="mailto:james.brown@biotronik.com">james.brown@biotronik.com</a></td>
<td>Evaluating the probability of MRI RF-induced unintended stimulation for an implantable loop recorder</td>
<td>Micro Systems Engineering, Inc., Lake Oswego, OR USA</td>
<td>15:00 PM – 15:20 PM</td>
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<td>47</td>
<td>Peter J. Serano <a href="mailto:pete.serano@ansys.com">pete.serano@ansys.com</a></td>
<td>Full-body detailed Toyota human model for radio-frequency simulations in Ansys Electronics Desktop</td>
<td>Ansys, Inc, Canonsburg, PA USA</td>
<td>15:20 PM – 15:40 PM</td>
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<tr>
<td>48</td>
<td>Gregory M. Noetscher <a href="mailto:gregn@wpi.edu">gregn@wpi.edu</a></td>
<td>A new FDA MDDT tool for implant heating modeling</td>
<td>ECE Dept., Worcester Polytechnic Inst., Worcester MA USA</td>
<td>15:40 PM – 16:00 PM</td>
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Questions to presenters, coffee break  

**Announcement of Student Competition Winners**  

16:10 PM – 16:20 PM