



Brain & Human Body Modeling (BHBM) – Online Local Conference

August 19-20, 2021

A.A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Charlestown MA
<http://education.martinos.org/brain-and-human-body-modeling-conference/>
(to be updated)

Support of the A.A. Martinos Center for Biomedical Imaging and Novocure, Inc. is greatly acknowledged
(to be updated)

It is planned posting recordings of the talks on the Conference website at Massachusetts General Hospital and distributing them through the network of Harvard Medical School

Authors are welcome to publish their presentations in a sponsored open-access annual book Brain & Human Body Modeling 2021 by Springer Nature. All open-access publications are free of charge

Preliminary Program as of August 12, 2021, **subject to change**

Presentation schedule (presentation times have been corrected to accommodate different time zones):

Review presentation: 20-30 min (25 min + 5 min for questions)

Research presentation: 12 min (10 min + 2 min for questions)

2021 BHBM Session Organizers:
Kyoko Fujimoto, Kris Carlson, Gregory Noetscher,
Aapo Nummenmaa, Sergey Makarov

Conference Introduction:
Bruce Rosen (MGH) 7:00-7:10 AM
Session I. In Silico Brain & Human Body Models

Thursday Aug. 19, 2021, Online Presentations

Chairs: Kyoko Fujimoto (GE Healthcare), Lilla Zöllei (MGH)

#	Presenters/email	Title	Organization	Eastern Standard Time (USA)
For <i>Virtual Population</i> please refer to Session VI				
1	Lilla Zöllei lzollei@mgh.harvard.edu	FreeSurfer for human brain: How to learn and use? (overview)	Mass General Hospital, USA	7:10 – 7:40 AM
2	Chansoo Choi, Chan Hyeong Kim cchoi91@hanyang.ac.kr	Next generation of ICRP adult and pediatric computational models and their potential applications	Hanyang University, Korea	7:40 – 7:52 AM
3	Sofia Rita Fernandes, Pedro Cavaleiro Miranda srefernandes@fc.ul.pt	Accurate realistic model of the spinal cord and surrounding tissues	Universidade de Lisboa, Portugal	7:52 – 8:04 AM
4	Gregory Noetscher gregn@nevaem.com	VHP-Female full body human model and its applications	NEVA Electromagnetics, USA	8:04 – 8:16 AM
14 min break. Questions to presenters				

Session II. Modeling Neuroimaging and Electrical Stimulation (Very Low Frequency Band), and Interplay Between Them

Thursday Aug. 19, 2021, Online Presentations

Chairs: Sofia Fernandes (U Lisbon), Scott Lempka (U. Michigan, Ann Arbor)

#	Presenters/email	Title	Organization	Eastern Standard Time (USA)
1	John Mosher John.C.Mosher@uth.tmc.edu	Source Modeling of Neural Activity: “All models are wrong, but some are useful” (overview)	McGovern Medical School, University of Texas Health Science Center at Houston, Texas, USA	8:30 – 9:00 AM
2	Carsten Wolters carsten.wolters@uni-muenster.de	New non-invasive multimodal neuroimaging and neurostimulation methods for improved diagnosis and therapy in refractory focal epilepsy (overview)	University of Münster, Germany	9:00 – 9:30 AM
3	Matti Hämäläinen mhamalainen@mgh.harvard.edu	MNE: Scalable and Sensor-Agnostic Software for Real-Time and Off-Line Processing of MEG/EEG Data (overview)	Harvard Medical School, USA	9:30 – 10:00 AM
10 min break. Questions to presenters				

Session II. (Cont.)

4	Hans J. Zander, Meagan K. Brucker, David Dinsmoor, Scott F. Lempka lempka@umich.edu	Model-based analysis of evoked compound action potentials generated during spinal cord stimulation	U. Michigan, Ann Arbor, Medtronic, USA	10:10 – 10:22 AM
5	Sofia Rita Fernandes, Pedro Cavaleiro Miranda srcfernandes@fc.ul.pt	Interplay between Electrical Conductivity of Tissues and Position of Electrodes in Transcutaneous Spinal Direct Current Stimulation	Universidade de Lisboa, Portugal	10:22 – 10:34 AM
6	Sergey Makarov, Haowen Wei, Aapo Nummenmaa makarov@wpi.edu	Interplay between TES and EEG modeling with boundary element fast multipole method (BEM-FMM) via Helmholtz reciprocity principle	Mass General Hospital, Worcester Pol. Inst., USA	10:34 – 10:46 AM
7	Paul Lunkenheimer p_lunk01@uni-muenster.de	Comparison of BEM-FMM and CG-FEM approaches for forward problems of EEG	University of Münster, Germany	10:46 – 10:58 AM
8	Malte Höltersshinken m_hoel20@uni-muenster.de	Block Krylov Solvers for Transfer Matrix Computations in Bioelectromagnetism	University of Münster, Germany	10:58 – 11:10 AM
10 min break. Questions to presenters				

Session III. Modeling Transcranial Magnetic Stimulation (Very Low Frequency Band)

Thursday Aug. 19, 2021, Online Presentations

Chairs: Aapo R. Nummenmaa (MGH), Samuel Zibman (BrainsWay)

#	Presenters/email	Title	Organization	Eastern Standard Time (USA)
1	Dylan Edwards edwarddy@einstein.edu	Open TMS and TES modeling problems in clinical rehabilitation (overview)	Moss Rehabilitation Research Inst., USA	11:20 AM–11:50 AM
2	Hanbing Lu, Qinglei Meng, Simone Baldwin, Samantha Cermak luha@mail.nih.gov	Focal TMS of the rat brain: validation and application to a rat model of cocaine dependence	NIH, USA	11:50 AM – 12:02 PM
3	Sina Shirinpour shiri008@umn.edu	Multi-scale Modeling of Single Neuron under Transcranial Magnetic Stimulation	University of Minnesota, USA	12:02 – 12:14 PM
4	Tayeb Zaidi, Kyoko Fujimoto tayeb.zaidi@fda.hhs.gov	Comparison of Simulated Electric Fields for TMS Using Three Different Brain Segmentation Methods	CDRH, FDA, USA	12:14 – 12:26 PM
10 min break. Questions to presenters				
5	Konstantin Weise, William Wartman kweise@cbs.mpg.de	Effect of Brain Membranes in TMS and TES	Max Planck Inst, Germany, WPI, USA	12:36 – 12:48 PM
6	Charles Lu, Zhi-De Deng, Fow-Sen Choa charlielu04@gmail.com	TMS Coil Design with Magnetic Materials to Optimally Shape E-Field Distribution	NIH, USA, University of Maryland, USA	12:48 – 1:00 PM
7	Hongming Li, Zhi-De Deng, Desmond Oathes, Yong Fan Yong.Fan@penntmedicine.upenn.edu	Real-time computation of transcranial magnetic stimulation electric fields using self-supervised deep learning	U Penn, USA, NIH, USA	1:00 – 1:12 PM
8	M. Daneshzand, S. Makarov, L. Navarro de Lara, B. Guerin, J. McNab, B.R. Rosen, M.S. Hamalainen, T. Raij, A. Nummenmaa mdaneshzand@mg.harvard.edu	Rapid evaluation of TMS induced E-fields using a dipole based magnetic stimulation profile approach	A.A. Martinos Ctr, Mass General Hospital, USA Stanford U USA	1:12 – 1:24 PM
9	Samuel Zibman, Dmitri Motenko, William Wartman, Gaby Pell, Sergey Makarov sam@brainsway.com	Biophysical modeling of Deep TMS H-coils within a TMS Modeling Toolkit	BrainsWay, Israel, WPI, USA	1:24 – 1:36 PM

Open discussion/questions to presenters	Chair Gregory Noetscher	1:45 -2:15 PM
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Session IV. Modeling Tumor Treating Fields (Intermediate Frequency Band) in the Brain

Friday Aug. 20, 2021, Online Presentations

Chairs: Eric Wong (BIDMC), Anders Korshøj (Aarhus U Hospital, Denmark)

#	Presenters/email	Title	Organization	Eastern Standard Time (USA)
1	Tal Marciano tmarciano@novocure.com	Overview of TTFields' Research Program Toward Full Efficacy in a Dose-Response Regime (overview)	Novocure Ltd., Haifa, Israel	7:30 – 8:00 AM
2	Nichal Gentilal, Ariel Naveh, Tal Marciano, Zeev Bomzon, Yevgeniy Telepinsky, Yoram Wasserman, and Pedro Cavaleiro Miranda ngentilal@fc.ul.pt	Optimization of TTFields planning: the importance of scalp's temperature in the predicted treatment efficacy	Universidade de Lisboa, Portugal, Novocure, Israel	8:00 – 8:12 AM
3	Nikola Mikic, F. L. Hansen, Fang Cao, Axel Thielscher, Anders R. Korshøj nikmik@rm.dk	Standardizing skull-remodeling surgery configuration to improve TTFields for first recurrence glioblastoma. A computational head modeling study	Aarhus University Hospital, Denmark, Technical University of Denmark	8:12 – 8:24 AM
4	Bryant D. Chang, Matthew A. Clark, Edwin Lok, Eric T. Wong bchang5@bidmc.harvard.edu	Modulation of Tumor Treating Fields by Craniectomy	Harvard University, USA	8:24 – 8:36 AM
5	Edwin Chang and Chirag B. Patel cbpatel@stanford.edu	Cell membrane permeabilization effects of tumor treating fields (TTFields): physical observations and theoretical basis	Stanford University, USA	8:36 – 8:48 AM
12 min break. Questions to presenters				

Session V. Software Suites for Modeling Purposes and Software-Hardware Interactions

Friday Aug. 20, 2021, Online Presentations

Chair: Kyoko Fujimoto (GE Healthcare)

#	Presenters/email	Title	Organization	Eastern St. Time (USA)
1	Ricard Salvador, Neuroelectrics ricardo.salvador@neuroelectrics.com	EEG Monitoring and Multi-Channel TES with Starstim (overview)	Neuroelectrics, Spain	9:00 – 9:30 AM
2	Esra Neufeld and Antonino M. Cassara, Zurich Med Tech/IT'IS Foundation neufeld@zmt.swiss , cassara@itis.swiss	Modeling of EM-Neuron Interactions with Sim4Life: Bioelectronic Medicine, Neuroprosthetics, and Exposure Safety (overview)	Zurich Med Tech, IT'IS Foundation, Switzerland	9:30 – 10:00 AM
3	Peter Serano, Ansys pete.serano@ansys.com	Ansys Thermal (overview)	Ansys, Inc. PA, USA	10:00 – 10:20 AM
10 min break. Questions to presenters				

Session VI. Intermediate Frequency and Radio Frequency Modeling with Computational Human Models: Safety and Imaging

Friday Aug. 20, 2021, Online Presentations

Chairs: Marc Horner (Ansys), James Brown (Biotronic)

#	Presenters/email	Title	Organization	Eastern St. Time (USA)
MRI Safety Emphasis				
1	Yihe Hua yihe.hua@ge.com	Peripheral Nerve Stimulation (PNS) Analysis of MRI Head Gradient Coils with Human Body Models (overview)	GE Research, USA	10:30 – 11:00 AM
2	Wolfgang Kainz wolfgang.kainz@fda.hhs.gov	Magnetic Resonance Safety Assessment Using Computational Modeling (overview)	CDRH, FDA, USA	11:00 – 11:30 AM
3	Alexander Prokop alexander.prokop@3ds.com	Voxelizing Human Surface Models for MRI RF SAR Simulation	Dassault Systèmes, Germany	11:30 – 11:42 AM
4	Peter Serano, Gregory Noetscher, Marc Horner pete.serano@ansys.com	Modeling MRI-Induced RF Heating with Ansys	Ansys Inc., USA WPI, USA	11:42 – 11:54 AM
5	James E. Brown, Krishna K.N. Kurpad, Paul J. Stadnik, Jeffrey A. Von Arx, Dirk Muessig james.brown@biotronik.com	RF-induced Heating Near Implanted Medical Devices in MRI: Impact of Computational Human Model	Micro Systems Engineering, Inc., USA	11:54 AM– 12:06 PM
6	Jasmine Vu, Bhumi Bhusal, Elizabeth Nowac, Joshua Rosenow, Julie Pilitsis, Laleh Golestanirad jasmine.vu@northwestern.edu bhumi.bhusal@northwestern.edu	SAR estimation of patients with deep brain stimulation implants in vertical open-bore MRI: Effect of patient-derived lead trajectories	Northwestern University, Albany Medical College, USA	12:06 – 12:18 PM
7	Mikhail Kozlov, K. Pine, and N. Weiskopf kozlov@cbs.mpg.de	Realistic model of the 3T Siemens Connectom birdcage coil	Max Planck Inst., Germany	12:18 – 12:30 PM
10 min break. Questions to presenters				
Communications and Imaging Emphasis				
8	Louis Chen louis_chen@bose.com	Electromagnetics of On-Body Communications at 2.4 GHz	Bose Corp., USA	12:40 – 12:52 PM
9	Jorge A. Tobon V, Francesca Vipiana jorge.tobon@polito.it	Microwave Imaging for Brain Stroke Continuous Monitoring	Politecnico di Torino, Italy	12:52 – 1:04 PM
10	Johnathan W Adams jwadams2@wpi.edu	Dual-Antiphase Antenna for Through-Body Propagation: Neural Network Classifier	Worcester Polytechnic Inst., USA	1:04 – 1:16 PM
11	Ara Nazarian anazaria@bidmc.harvard.edu	How Microwave Imaging Might Help Orthopaedic Doctors? A Wish List	Harvard Univ., USA	1:16 – 1:28 PM

Open discussion/questions to presenters	Chair – Gregory Noetscher	1:30 PM - 2:00 PM
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