# Jean-Marie Bouteiller, PhD.

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## EDUCATION

- **Doctor of Philosophy Degree in Neurosciences (Computational)** (2002) from University of Southern California.
- **Master of Science Degree in Engineering** (1996) from University of Sciences of Montpellier (France), Electrical Engineering, Computer Science and Optronics.
- **Undergraduate Degree in Physics** (1993) from University Institute of technology (IUT), Montpellier (France).

## WORK EXPERIENCE

2013- **Research Assistant Professor, Laboratory of Neural Engineering, USC (Los Angeles, CA)**

- Managed the *Elementary Objects of the Nervous System* project (EONS)
  - Adapted the EONS glutamatergic synaptic modeling platform for parallel computing environment and toward neuronal level integration.
  - Extended the platform to include state-of-the-art subsynaptic models and complex second messenger pathways. Extensions towards SBML support and Systems Biology Standards.
  - Extended the platform towards multiscale modeling abilities
  - Developed collaborations with various partners (research laboratories and companies).
  - Developed partnerships with Rhenovia Pharma (Utilization of the EONS modeling platform for exogenous compound effect characterization in the central nervous system) and Kernel LLC (2016).
  - Developed and supervised the implementation of novel kinetic schemes (with orthosteric and/or allosteric sites) as well as functional models.
- Managed a team of undergraduate & graduate students, interns, programmers and bioinformatics engineers.
- Gave several lectures on S*ynaptic Transmission* in USC Neuroscience and Biomedical Engineering graduate classes (NEUR524, BME502, BME552, BME680).

2010-2013 **Senior Research Associate, Laboratory of Neural Engineering, USC (Los Angeles, CA)**

2006-2010 **Research Associate, Laboratory of Neural Engineering, USC (Los Angeles, CA)**
**(Laboratory Supervisor T.W. Berger)**

2002-2006 **Post-Doctoral Fellow, Laboratory of Neural Engineering, USC (Los Angeles, CA)**
**(Laboratory T.W. Berger)**

- Designed and developed the EONS project
  - Implemented the EONS glutamatergic synaptic modeling platform. This platform is made publicly available worldwide for research and education purposes.
  - Utilized platform-independent Java WebStart technology and mySQL for integrated database support.
- Published various abstracts and manuscripts (see publications section, page 2).
- Presented research findings at international conferences.
- Managed a team of undergraduate and graduate students.
- Participated actively in the Online Multimedia Neuroscience Education Tool (NSF Grant)

1997-2002 **Graduate Student Research Assistant, Neuroscience Program, USC (Los Angeles, CA)**
**(Advisor M. Baudry)**

- Developed a neurochemistry database (project funded by the National Institute of Mental Health: *The Human Brain Project*).
- Designed and developed optimal three-dimensional reconstruction methods for biological shapes from sparse undersampled two-dimensional sections of brain tissue (dissertation: "*3D Reconstruction from Serial Non-contiguous Sections Using Variational Implicit Techniques*")

1997 **Student Researcher, Laboratory of Signal & Image, University of Saint-Jérome (Marseille, France)**

- Created and implemented algorithms for localization and pursuit of objects in images.

1996 **Engineer, German Aerospace Research Center, DLR (Braunschweig, Germany)**

- Designed, developed and validated algorithms to simulate control devices necessary for the in-flight electric control system using Computer Aided Software Engineering (CASE) tools (Airbus A380).
- Developed algorithms and a driver interface for the in-flight electric control system (for the in-flight simulator; C language).

## COMPUTER SKILLS

- Programming: Python, Java, C, C++, Neuron, Pascal, Visual Basic, VRML, HTML, SQL, SBML
- Hardware: Assemble, configure and maintain PC-based platforms
- Operating Systems: Mostly PC, some experience with Mac, Linux and Unix-based systems
- Database: MySQL, Access
- General: MS Office, Visio, Photoshop, Illustrator, Flash, Subversion SVN, JBuilder, Netbeans, Apache Web server, MySQL database server, O3spaces document management

## JOURNALS

**Associate Editor** **World Research Journal of Computational Neuroscience**

World Research Journal of Computational Neuroscience is a broad-based journal was founded on two key tenets; (i) to publish the most exciting researches with respect to the subjects of Computational Neuroscience, and (ii) to provide a rapid turn-around time possible for reviewing and publishing, and to disseminate the articles freely for research, teaching and reference purposes. The Journal Aim and Scope covers following research areas (but not limited to): Biological Neuron Models, Brain-Computer Interface, Connectionism, Neural Coding, Neural Engineering, Neural Network, Neurocomputational Speech Processing, and Neuroinformatics.

**Ad-hoc Reviewer**

**Plos ONE (from 2013)**
**Transactions on Biomedical Engineering**
**Brain Research (Recognized Reviewer Status)**
**Journal of Neuroscience Methods (from 2015)**
**BMC Research Notes (from 2015)**
**Neural Plasticity (from 2015)**

## ACTIVE GRANTS

BMSR Biomedical Simulation Resources, NIBIB/NIH (4P41EB001978-32)
$4,075,000 (TDC) 9/1/13-8/31/18
Role: Co-Investigator (PIs: D. Z. D'Argenio, V. Z. Marmarelis)
Implementation of parametric and non-parametric computational models and synapses and neural elements; creation, enhancements and maintenance of the EONS synaptic modeling platform. Dissemination of the modeling platform using classes, short courses and a dedicated website with platform download, guides and tutorials.

Predictive Modeling of Bioelectric Activity on Mammalian Multilayered Neuronal Structures in the Presence of Supraphysiological Electric Fields, NIH, U01 (GM104604)
$2,041,888 09/15/2012 – 08/31/2017

Role: Co-Investigator (PI: G. Lazzi, USC-PI: T. W. Berger)
Development of multiscale models to accelerate biological, biomedical, behavioral, environmental and clinical research through predictive, computational models that encompass multiple biological and behavioral scales.

RAM: Development of a Human Memory Prosthetic (N66001-14-C-4016), DARPA
$4,812,860 12/21/2016 – 12/20/2018
Role: Co-Investigator (Co-PIs: S. A. Deadwyler, R. E. Hampson, D. Song, and T. W. Berger)

## PUBLICATIONS

### REFEREED JOURNAL PUBLICATIONS AND BOOK CHAPTERS

Anne F. Keller, Jean-Marie C. Bouteiller, Theodore W. Berger. Computational exploration of NMDA receptors. Book Chapter in the book *Methods in Molecular Biology: NMDA receptors*, Springer.

Calcium Hypothesis of Alzheimer's disease and brain aging: A framework for integrating new evidence into a comprehensive theory of pathogenesis. Written by the Alzheimer's Association Calcium Hypothesis Workgroup; Workgroup members: Ottavio Arancio; Bezprozvanny, Ilya; Theodore Berger; **Jean-Marie Bouteiller**; Maria Carrillo; John Disterhoft; Kevin Foskett; Ara S. Khachaturian; Frank LaFerla; Philip W. Landfield; Eliezer Masliah; Mark Mattson; Mary L. Michaelis; Ralph Nixon; Heather Snyder; Grace Stutzmann; Olivier Thibault; Austin Yang; Zaven S. Khachaturian; and Ken Scholz. Alzheimer's & Dementia: The Journal of the Alzheimer's Association, Volume 13, Issue 2, 178 - 182.e17. DOI: http://dx.doi.org/10.1016/j.jalz.2016.12.006.

**Jean-Marie C. Bouteiller**, Theodore W. Berger, *The Role of Simulations in Neuropharmacology* in *Computational Neurology – Computational Psychiatry: How and Why*; Editors: Peter Erdi, Basabdatta Sen Bhattacharva, Amy Cochran. January 2017, Springer. ISBN 978-3-319-49959-8.

Clayton Bingham, Gene Yu, Kyle Loizos, **Jean-Marie C. Bouteiller**, Dong Song, Theodore W. Berger (2016), Optimization of cortical electrode design, placement, and stimulation via co-simulation of large-scale compartmental neuronal and multi-resolution admittance models. Frontiers in Computational Neuroscience. Submitted for Review.

Renaud Greget, Selma Dadak, Laure Barbier, Fabien Lauga, Sandra Linossier-Pierre, Fabien Pernot, Arnaud Legendre, Nicolas Ambert, **Jean-Marie Bouteiller**, Frédéric Dorandeu, Serge Bischoff, Michel Baudry, Laurent Fagni, Saliha Moussaoui; *Modeling and simulation of organophosphate-induced neurotoxicity: Prediction and validation by experimental studies*, NeuroToxicology 54 · April 2016; DOI: 10.1016/j.neuro.2016.04.013.

Keller, Florence; Ambert, Nicolas; Legendre, Arnaud; Bedez, Mathieu; **Bouteiller, Jean-Marie**; Bischoff, Serge; Baudry, Michel; Moussaoui, Saliha; *Impact of synaptic localization and subunit composition of ionotropic glutamate receptors on synaptic function: modeling and simulation studies*, IEEE/ACM Transactions on Computational Biology and Bioinformatics · May 2016. DOI: 10.1109/TCBB.2016.2561932.

Sushmita L Allam, **Jean-Marie C Bouteiller**, Eric Y Hu, Nicolas Ambert, Renaud Greget, Serge Bischoff, Michel Baudry, Theodore W Berger, *Synaptic Efficacy as a Function of Ionotropic Receptor Distribution: A Computational Study*, PLOS ONE 10(10):E0140333 · October 2015. DOI: 10.1371/journal.pone.0140333.

Mathieu Bedez, Zakaria Belhachmi, Olivier Haeberlé, Renaud Greget, Saliha Moussaoui, **Jean-Marie Bouteiller**, Serge Bischoff. *A fully parallel in time and space algorithm for simulating the electrical activity of a neural tissue*. Journal of Neuroscience Methods 10/2015; 257. DOI:10.1016/j.jneumeth.2015.09.017.

Eric Y. Hu, **Jean-Marie C. Bouteiller**, Dong Song, Michel Baudry, Theodore W. Berger, *Volterra representation enables modeling of complex synaptic nonlinear dynamics in large-scale simulations*. Front Comput Neurosci. 2015; 9: 112. DOI: 10.3389/fncom.2015.00112.

Somogyi E.T., **Bouteiller J.-M. C.**, Glazier J. A., Köenig M., Medley K., Swat M., Sauro H.M., *LibRoadRunner: A High Performance SBML Simulation and Analysis Package*. Bioinformatics 03/2015; 31(20). DOI:10.1093/bioinformatics/btv363.

Sarmis M, Orjuela R, **Bouteiller J. C**, Ambert N, Legendre A, Bischoff S., Haeberlé O., Baudry M. (2015) Stability Constraints of Markov State Kinetic Models Based on Routh-Hurwitz Criterion. J Comput Sci Syst Biol 08:296-303. doi:10.4172/jcsb.1000204.

**Bouteiller J.-M. C.**, Berger T.W. (2014), *Tri-Partite Synapse (Neuron-Astrocyte Interactions), Conductance Models*, Encyclopedia of Computational Neuroscience. DOI: 10.1007/978-1-4614-7320-6_363-1.

Albash T., **Bouteiller J.-M. C.**, Berger T.W., Baudry M., Haas S. (2013), Back Action on Neurotransmitters by Receptor Binding Reveals an Optimal Receptor Density Profile, J Comput Sci Syst Biol 6:327-336. DOI: 10.4172/0974-7230.1000129.

Sarmis M., **Bouteiller J.-M. C.**, Ambert N., Legendre A., Bischoff S., Haeberlé O., Baudry M., *Assessing Numerical Resolution Methods Performance for Kinetic Models of Receptors and Channels*. Journal of Computer Science & Systems Biology 07/2013; 6(3):150-164. DOI:10.4172/jcsb.1000112

Bischoff S., Baudry M., **Bouteiller J.-M. C.**, *La biosimulation propulse la recherche de médicaments pour maladies rares. Biosimulation propels drug discovery for rare diseases*. EOS Magazine, 2012, Belgium version of Scientific American (in French).

Allam S. L., Ghaderi V. S., **Bouteiller J.-M. C.**, Legendre A., Bischoff S., Baudry M., Berger T. W., *A computational model to investigate astrocytic glutamate uptake influence on synaptic transmission and neuronal spiking*, Frontiers in Computational Neuroscience, 6(70), doi: 10.3389/fncom.2012.00070

Baudry M., Greget R., Pernot F., **Bouteiller J-M.**, Bi, X., *mGluRI Roles under Physiological Conditions and in Neurodegeneration*, Wiley Interdisciplinary Reviews: Systems Biology and Medecine, 2012. doi: 10.1002/wmts.51.

Greget R., Pernot F., **Bouteiller J-M. C.**, Ghaderi V., Allam S. L., Keller A. F., Ambert N., Sarmis M., Haeberle O., Faupel M., Bischoff S., Berger T. W., Baudry M. (2011), *Simulation of Postsynaptic Glutamate Receptors Reveals Critical Features of Glutamatergic Transmission*", PLoS ONE 6(12): e28380. doi:10.1371/journal.pone.0028380.

**Bouteiller J-M. C.**, Allam S. L., Hu E. Y., Greget R., Ambert N., Keller A. F., Bischoff S., Baudry M., Berger T. W., *Integrated Multi-Scale Modeling of the Nervous System: Predicting Changes in Hippocampal Network Activity by a Positive AMPA Receptor Modulator*, Transactions on Biomedical Engineering, October 2011, Volume 58:10, pp. 3008-3011. Doi: 10.1109/TBME.2011.2158605.

Ambert, N., Greget, R., Haeberlé, O., Bischoff, S., Berger, T. W., **Bouteiller, J-M. C.**, Baudry, M., *Computational Studies of NMDA Receptors: Differential Effects of Neuronal Activity on Efficacy of Competitive and Noncompetitive Antagonists*. Open Access Bioinformatics, August 2010, Volume 2010:2, pp. 113 – 125. Doi: 10.2147/OAB.S7246.

**Bouteiller J-M. C.**; Baudry M.; Allam S.L.; Greget R. J.; Bischoff S.; Berger T.W., *Modeling Glutamatergic Synapses: Insights into Mechanisms Regulating Synaptic Efficacy*, Journal of Integrative Neuroscience, 2008;7(2): 185-97. Doi: 10.1142/S0219635208001770.

**Bouteiller J-M.**, Baudry M., Berger T.W., *EONS an Online Synaptic Modeling Platform*, Encyclopedia of Healthcare Information Systems (2008), Edition: Hershey, Publisher: IGI Global, Editors: N. Wickramasinghe, E. Geisler, pp.527-533; doi: 10.4018/978-1-59904-889-5.ch067.

Baudry M., **Bouteiller J-M.**, Liaw J-S., Berger T. W., *NMDA Receptors: Synaptic, Cellular and Network Models*, in *Handbook of Brain Theory and Neural Networks* Second Edition M. Arbib (Ed.) MIT Press, 2002.

Timsari B., **Bouteiller J.M.**, Leahy R., Baudry M., *Registering 2D Slice Data to 3D Surface Atlases*, in *Computing the Brain: A guide to Neuroinformatics* – Academic Press, 2001.

Scorcioni R., **Bouteiller J.M.**, Ascoli G., *A Real-scale Anatomical Model of the Dentate Gyrus Based on Single Cell Reconstructions and 3D Rendering of a Brain Atlas*, Neurocomputing Volumes 44-46, June 2002, Pages 629-634.

**CONFERENCE PROCEEDINGS**

Hu, E.Y., **Bouteiller, J.-M.C.,** Song D., Berger, T.W. *Development of a Detailed Model of Calcium Dynamics at the Postsynaptic Spine of an Excitatory Synapse.* Proceedings of the Engineering in Medicine and Biology Society (EMBC), 2016 38th Annual International Conference of the IEEE. DOI: 10.1109/EMBC.2016.7592121.

Bingham, Clayton S., Loizos, Kyle, Yu, Gene, Gilbert, Andrew, **Bouteiller, Jean-Marie**, Song, Dong, Lazzi, Gianluca, Berger, Theodore W. *A large-scale detailed neuronal model of electrical stimulation of the dentate gyrus and perforant path as a platform for electrode design and optimization.* 2016 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Orlando, FL, 2016, pp. 2794-2797. DOI: 10.1109/EMBC.2016.7591310

Hu, E.Y., **Bouteiller, J.-M.C.,** Song D., Berger, T.W. *The Volterra Functional Series is a Viable Alternative to Kinetic Models for Synaptic Modeling - Calibration and Benchmarking*. Engineering in Medicine and Biology Society (EMBC), 2015 37th Annual International Conference of the IEEE, vol., no., pp.3291-3294, 25-29 Aug. 2015. DOI: 10.1109/EMBC.2015.7319095.

Jordan Cline, Clayton Bingham, Kyle Loizos, Gene Yu, Phillip Hendrickson, **Jean-Marie Bouteiller**, Theodore Berger, Gianluca Lazzi, *Estimation of Initiated Local Field Potential by Neurons in Heterogeneous Tissue Environment using Admittance Method*, 2015 IEEE International Symposium on Antennas and Propagation and North American Radio Science Meeting, Vancouver, CANADA. Pages: 310 - 310, DOI: 10.1109/USNC-URSI.2015.7303594.

**Bouteiller, J.-M.C.**; Zhuobo Feng; Onopa, A.; Huang, M.; Hu, E.Y.; Somogyi, E.; Baudry, M.; Bischoff, S.; Berger, T.W., "*Maximizing predictability of a bottom-up complex multi-scale model through systematic validation and multi-objective multi-level optimization*" in Neural Engineering (NER), 2015 7th International IEEE/EMBS Conference on , vol., no., pp.300-303, 22-24 April 2015. DOI: 10.1109/NER.2015.7146619.

Hu, E.Y.; **Bouteiller, J.-M.C.**; Huang, M.; Dong Song; Berger, T., *A comparison between direct and indirect measurements of neurotransmitter vesicle release dynamics: A computational study*, Engineering in Medicine and Biology Society (EMBC), 36th Annual International Conference of the IEEE, 2014, pp.1155-1158, 26-30 Aug. 2014. DOI: 10.1109/EMBC.2014.6943800

**Bouteiller J-M. C.**, Allam S. L., Ambert N., Greget N., Hu E. Y., Bischoff S., Baudry M., Berger T. W., *Influence of ionotropic receptors localization on glutamatergic synaptic response to paired-pulse stimulation protocol*, Proceedings of the IEEE EMBS Conference, 2013, pp.1041-1044. DOI:10.1109/EMBC.2013.6609682

**Bouteiller J-M. C.**, Hu E. Y., Allam S. L., Ghaderi V., Song D., Berger T. W., *Insights on synaptic paired-pulse response using parametric and non-parametric models*, Proceedings of the IEEE EMBS Conference, 2013, pp.1037-1040. DOI:10.1109/EMBC.2013.6609681

Ghaderi V., Song D., **Bouteiller J-M. C.**, Choma J., Berger T. W., *A programmable analog subthreshold biomimetic model for bi-directional communication with the brain*, Proceedings of the IEEE EMBS Conference, 2013, pp. 787-790. DOI:10.1109/EMBC.2013.6609618

**Bouteiller J-M. C.**, Legendre A., Allam S. L., Ambert N., Hu E. Y., Greget R., Keller A. F., Pernot F., Bischoff S., Baudry M., Berger T. W., *Modeling of the Nervous System: From Modulation of Glutamatergic and Gabaergic Molecular Dynamics to Neuron Spiking Activity*, Proceedings of the IEEE EMBS Conference, 2012, pp. 6612-5. DOI:10.1109/EMBC.2012.6347510.

Allam S. L., **Bouteiller J.-M. C.**, Hu E. Y., Greget R., Ambert N., Bischoff S., Baudry M., Berger T. W., *Influence of Ionotropic Receptor Location on their Dynamics at Glutamatergic Synapses*, Proceedings of the IEEE EMBS Conference, 2012, pp.1374-7. DOI:10.1109/EMBC.2012.6346194.

**Bouteiller J-M. C.**, Allam S. L., Hu E. Y., Greget R., Ambert N., Keller A. F., Pernot F., Bischoff S., Baudry M., Berger T. W., *Modeling of the Nervous System: From Molecular Dynamics and Synaptic Modulation to Neuron Spiking Activity*, Proceedings of the IEEE EMBS Conference, 2011, pp. 445-448.

Ghaderi V. S., Allam S. L., Ambert N., **Bouteiller J-M. C.**, Choma J., Berger T. W., *Modeling Neuron-Glia Interactions: From Parametric Model to Neuromorphic Hardware*, Proceedings of the IEEE EMBS Conference, 2011, pp. 3581-3584.

**Bouteiller, J-M. C.**, Allam, S. L., Greget, R., Ambert, N., Hu, E. Y., Bischoff, S., Baudry, M., Berger, T. W. *Paired-Pulse Stimulation at Glutamatergic Synapses - Pre- and Postsynaptic Components*. Proceedings of the IEEE EMBS Conference, 2010, pp. 787-790.

Allam S. L., **Bouteiller J-M.**, Greget R., Bischoff S., Baudry M., and Berger T. W. *EONS Synaptic Modeling Platform: Exploration of Mechanisms Regulating Information Processing in the CNS and Application to Drug Discovery*. Proc. ASME. 48337; ASME Proceedings of the 3rd Frontiers in Biomedical devices Conference, 2008, pp. 117-118. doi: 10.1115/BioMed2008-38095.

**Bouteiller J-M.**, Qiu Y., Ziane M., Baudry M., Berger T.W., *EONS: An Online Synaptic Modeling Platform*, IEEE Engineering in Medicine and Biology Society, 2006.

**Bouteiller J-M.**, Marchessoux C., *Comparison Study between 3D Modelling of Human Foot*, 3D Modeling, 2003, 3D Human, Paris.

**Bouteiller J-M.**, Wu B., Baudry M., *Implicit Functions: Applications in Medicine and Biology*, SPIE Medical Imaging 2003.

**Bouteiller J.M.**, Baudry M., *Neuroanatomical Imaging: Constrained 3D Reconstruction Using Variational Implicit Techniques*, First international symposium on 3D data Processing Visualization Transmission, 2002 (page 62).

Timsari B., Tocco G., **Bouteiller J.M.**, Baudry M., Leahy R., *Accurate Registration of Autoradiographic Images of Rat Brain Using a 3-D Atlas*, The International Conference on Imaging Science, Systems, and Technology (CISST), 2000.

**PUBLISHED ABSTRACTS**

A. Mergenthal, **J.-M. C. Bouteiller**, E. Hu, T. W. Berger; *Simulated effects of acetylcholinesterase inhibitors on hippocampal cell network activity;* Society for Neuroscience 2016.

C. S. Bingham, **J.-M. Bouteiller**, D. Song, T. W. Berger; *A model of axonal branching for medium and long range fibers in a multi-scale model of hippocampal tissue*; Society for Neuroscience 2016.

E. Y. Hu, A. Mergenthal, **J.-M. C. Bouteiller**, D. Song, T. W. Berger; *A detailed computational model of mechanisms underlying calcium regulation and dysregulations in glutamatergic postsynaptic spines*; Society for Neuroscience 2016.

R. Greget, L. Barbier, S. Dadak, F. Laloue, **J.-M. C. Bouteiller**, L. Fagni, F. Dorandeu, S. Bischoff, M. Baudry, S. Moussaoui. Prediction of glutamatergic neurotoxicity of drugs and pollutants by biosimulation: cholinesterase inhibitors (AChEI) and metallic nanoparticles (MNPs). Society for Neuroscience 2015.

E. Y. Hu, **J.-M. Bouteiller**, D. Song, M. Baudry, T. W. Berger; Nonlinear modeling of calcium dynamics in glutamatergic postsynaptic spine for large scale simulations. Society for Neuroscience 2015.

**J.-M. C. Bouteiller**, E. Y. Hu, E. T. Somogyi, Y. Guo, D. Rousso, Y. Zhang, C. Chen, J. Venkatesh, D. Song, T. W. Berger; MEMORY, A SBML based Multiscale simulation platform integrating both parametric and non-parametric modeling methodologies. Society for Neuroscience 2015.

**J.-M. C. Bouteiller**, Z. Feng, A. Onopa, M. Huang, E. Y. Hu, E. Somogyi, M. Baudry, S. Bischoff, T. W. Berger, *Maximizing predictability of a bottom-up complex multi-scale model through systematic validation and multi-objective multi-level optimization*, Society for Neuroscience 2014.

C. Bingham, K. Loizos, Y. Guo, G. J. Yu, P. J. Hendrickson, **J.-M. C. Bouteiller**, G. Lazzi, T. W. Berger, *Multi-scale simulation of extracellular electrode stimulation in the dentate gyrus*, Society for Neuroscience 2014.

M. Huang, **J-M.C. Bouteiller**, E. Hu , T.W. Berger, *Multi-Objective Optimization of a detailed computational model of a CA1 pyramidal neuron*, Society for Neuroscience 2014.

E. Y. Hu, M. Huang, **J.-M.C. Bouteiller**, D. Song, S. Bischoff, M. Baudry, T. Berger, *An Input-Output Model of the Glutamatergic Synapse for Improved Computational Efficiency in Multi-Scale Modeling*, Society for Neuroscience 2014.

A. Legendre, M. Bedez, M. Sarmis, A. F. Keller, N. Ambert, R. Greget, F. Laloue, **J.-M. C. Bouteiller**, M. Baudry, S. Bischoff, S. Moussaoui, *An in silico simulator to study oscillopathies and drug effects in various neurological disorders*, Society for Neuroscience 2014.

A. F. Keller, N. Ambert, A. Legendre, M. Bedez, **J.-M. C. Bouteiller**, S. Moussaoui, S. Bischoff, M. Baudry, *Impact of synaptic localization and subunit composition of ionotropic glutamate receptors on synaptic function: modeling and simulation studies*, Society for Neuroscience 2014.

C. Bingham, K. Loizos, G. Yu, P. Hendrickson, **J.-M. C. Bouteiller**, D. Song, G. Lazzi, T. W. Berger, Towards optimizing MEA design, placement, and stimulation patterns using a multi-scale multi-model framework, IMAG Multiscale Modeling Consortium Meeting 2014, 20 - 21 Sep 2014.

S. Bischoff, R. Greget, F. Pernot, S. Moussaoui, F. Keller, A. Legendre, F. George, M. Faupel, **J.-M. Bouteiller**, M. Baudry, *Discovery of a new mode of action of RHEDAR™ through modeling and simulation, and its repositioning for Huntington's Disease treatment*, Annual Meeting for the Society for Neuroscience, 2013.

E. Y. Hu, **J.-M. C. Bouteiller**, S. L. Allam, N. Ambert, S. Bischoff, D. Song, M. Baudry, T. W. Berger, *Analysis of drug-induced changes in synaptic and neuronal responses with parametric and nonparametric modeling*, Annual Meeting for the Society for Neuroscience, 2013.

M. Huang, **J.-M. C. Bouteiller**, S. Allam, E. Hu, S. Qadri, A. Onopa, M. Baudry, T. W. Berger, *Optimization of a computational model of a CA1 pyramidal neuron, from biomolecular synaptic mechanisms to synaptic and neuronal ultrastructure*, Annual Meeting for the Society for Neuroscience, 2013.

A. F. Keller, N. Ambert, A. Legendre, R. Greget, M. Sarmis, M. Bedez, F. Laloue, J. Koenig, **J.-M. C. Bouteiller**, S. Bischoff, T. W. Berger, M. Baudry, *Identification of synergistic drug combinations using modeling and simulation of Long-Term Potentiation*, Annual Meeting for the Society for Neuroscience, 2013.

A. Legendre, F. Pernot, R. Greget, C. Roucard, A. Depaulis, L. Fagni, A. F. Keller, N. Ambert, M. Sarmis, **J.-M. C. Bouteiller**, M. Baudry, T. W. Berger, S. Bischoff, *Biosimulation of mesiotemporal lobe epilepsy for the search of new antiepileptic drugs and anticipation of proconvulsant risks*, Annual Meeting for the Society for Neuroscience, 2013.

A. Legendre, F. Pernot, A. F. Keller, R. Greget, N. Ambert, **J.-M. C. Bouteiller**, S. Bischoff, T. W. Berger, M. Baudry, *Is LTP an all-or-none phenomenon at glutamatergic synapses? A biosimulation approach incorporating the search for cognitive enhancers*, Annual Meeting for the Society for Neuroscience, 2012.

**J.-M. C. Bouteiller**, S. L. Allam1, Y. Hu, V. S. Ghaderi, A. Legendre, N. Ambert, R. Greget, M. Sarmis, A. F. Keller, F. Pernot, S. Bischoff, M. Baudry, T. W. Berger, *Multi-scale modeling and simulation of the glutamatergic - Gabaergic transmission: Influence of synaptic parameters on neuronal spiking*, Annual Meeting for the Society for Neuroscience, 2012.

T. Albash, **J.-M. C. Bouteiller**, T. W. Berger, M. Baudry, S. Haas, *Using constrained diffusion for glutamate reveals optimal AMPA and NMDA receptor distributions at glutamatergic synapses*, Annual Meeting for the Society for Neuroscience, 2012.

S. L. Allam, **J.-M. C. Bouteiller**, E. Hu, R. Greget, N. Ambert, S. Bischoff, M. Baudry, T. W. Berger, *Synaptic efficacy as a function of ionotropic receptors distribution and input activity at single glutamatergic synapses*, Annual Meeting for the Society for Neuroscience, 2012.

E. Y. Hu, V. Ghaderi, S. Allam, **J.-M. Bouteiller**, M. Baudry, T. W. Berger, *Non-parametric analysis of EONS/RHENOMS parametric input/output data before and after LTP induction*, Annual Meeting for the Society for Neuroscience, 2012.

A. Keller, N. Ambert, A. Legendre, F. Pernot, R. Greget, **J.-M. C. Bouteiller**, T. W. Berger, M. Baudry, S. Bischoff, *Why are nicotinic receptor agonists failing in clinical trials? Lessons from biosimulation of alpha7 neuronal nicotinic receptors*, Annual Meeting for the Society for Neuroscience, 2012.

**Bouteiller J-M. C.**, Allam S. L., Hu E. Y., Ghaderi V. S., Ambert N., Legendre A., Greget R., Sarmis M., Keller A. F., Pernot F., Bischoff S., Baudry M., Berger T. W., *From Synapses to Mini-network: Modeling the Effects of Positive AMPA Receptor Modulator*, Annual Meeting for the Society for Neuroscience, 2011.

Greget R., Pernot F., **Bouteiller J-M. C.**, Ghaderi V., Allam S. L., Keller A. F., Ambert N., Legendre A., Sarmis M., Haeberle O., Bischoff S., Berger T. W., Baudry M., *Simulation of Postsynaptic Glutamate Receptors Reveals Critical Features of Glutamatergic Transmission*, Annual Meeting for the Society for Neuroscience, 2011.

Allam S. L., Ghaderi V., **Bouteiller J-M. C.**, Ambert N., Baudry M., Berger T. W., *Computational Modeling of Synaptic Non-linear Dynamics: from a Tri-partite Synapse to a Neuron-glia Network*, Annual Meeting for the Society for Neuroscience, 2011.

Hu E. Y., Allam S. L., **Bouteiller J-M. C.**, Sarmis M., Ambert N., Greget R., Bischoff S., Baudry M., Berger T. W., *Comparative Analysis of the Synaptic Modeling Platform EONS and its Application in Multilevel Modeling*, Annual Meeting for the Society for Neuroscience, 2011.

Albash T., Haas S., **Bouteiller J-M. C.**, Baudry M., Berger T. W., *Receptor Back-reaction: Do the Dynamics of Receptor Binding Modify the Concentration of Neurotransmitter in the Synaptic Cleft?*, Annual Meeting for the Society for Neuroscience, 2011.

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Greget, R., Ambert, N., Keller, F., Pernot, F., Bischoff, S., **Bouteiller, J-M. C.**, Berger, T. W., Baudry, M. *Metabotropic Glutamate Receptor Group I: A Computational Study of the Effects of their Localization on Glutamatergic Transmission for the Optimization of the Discovery of mGluR Modulators*. Annual Meeting for the Society for Neuroscience, 2010.

Ghaderi, V., Allam, S. L., Greget, R., Ambert, N., Sarmis, M., Bischoff, S., **Bouteiller, J-M. C.**, Parker, A., Baudry, M., Berger, T. W. *Extension of the Eons / Rhenoms Biosimulation Platform to a Tripartite Synapse*. Annual Meeting for the Society for Neuroscience, 2010.

Ambert, N., Greget, R., Bischoff, S., Berger, T.W., **Bouteiller, J.-M.C.**, and Baudry, M. *Memantine Interactions with NMDA Receptors: Modeling and Simulation Studies of the Effect of Frequency and Membrane Potential*. Annual Meeting for the Society for Neuroscience, 2009.

Greget, R., Ambert, N., Baudry, M., Berger, T.W., **Bouteiller, J.-M.C.**, and Bischoff, S. *Functional Simulation of Excitatory Synaptic Transmission: A New Technology for Innovative CNS Drugs and Synergistic Combinations*. Annual Meeting for the Society for Neuroscience, 2009.

Allam, S.L., Greget, R., Ambert, N., **Bouteiller, J.-M.C.**, Baudry, M., Bischoff, S. and Berger, T.W. Modeling the Brain: from Synapse to Neuron. Annual Meeting for the Society for Neuroscience, 2009.

**Bouteiller J-M.**, Greget R., Allam S.L., Bischoff S., Baudry M., Berger T.W., *Using EONS-RHENOMS Synaptic Modeling Platform to Study the Role of AMPA Receptor Spatial Distribution and Number on Glutamatergic Synaptic Transmission*, Annual Meeting for the Society for Neuroscience, 2008.

Bischoff S., Faupel M.-D., **Bouteiller J-M.**, Greget R., Allam S., Kremers J., Berger T.W., Baudry M.; *Rhenovia Drug Discovery Optimization Service (Rheddos®): a New Tool for Pharmaceutical Companies*, Annual Meeting for the Society for Neuroscience, 2008.

**Bouteiller J-M.**, Baudry M., Berger T.W., *EONS: A Glutamatergic Modeling Platform for Studying Nonlinear Synaptic Dynamics*, Annual Meeting for the Society for Neuroscience, 2006.

**Bouteiller J-M.**, Baudry M., Berger T.W., *EONS: A Platform for Studying Mechanisms Underlying Nonlinear Dynamics of Synaptic Transmission*, Annual Meeting for the Society for Neuroscience, 2004.

**Bouteiller J-M.**, Berger T.W., *Online Glutamatergic Synaptic Model*, Annual Meeting for the Society for Neuroscience, 2003.

**Bouteiller J-M.**, D. M. Simmons, Yamada W. M., Baudry M., Berger T.W., *Glutamatergic Synapse Model on the Web*, Annual Meeting for the Society for Neuroscience Meeting, 2002.

**Bouteiller J.M.**, Simmons D.M., Baudry M., *Three-Dimensional Reconstruction of a Rat Brain Atlas: Application to Hippocampus Reconstruction*, Annual Meeting for the Society for Neuroscience, 2000.

**DISSERTATION**

**Bouteiller J-M.**, *3D Reconstruction from Serial Non-contiguous Sections Using Variational Implicit Techniques*, PhD dissertation (Thesis Advisor: M. Baudry), University of Southern California, December 2002.

## INTERNSHIPS

- **1993 - Polytechnic University of Preston (Preston, England) – 3 months**.
  Developed an automatic remote weather station (Visual Basic)

## OTHER SKILLS

**Languages**: Bilingual in French/English, proficient in German, conversant in Spanish.

**References:** Michel Baudry, Dean of the Graduate College of Biomedical Sciences, Western University, Pomona CA
Theodore W. Berger, Professor of Biomedical Engineering, Director, Center for Neural Engineering, USC
Serge Bischoff, CEO Rhenovia Pharma

## TEACHING AND SEMINARS

**CLASSES**
Taught fundamentals and recent advances of synaptic transmission, its role and underlying biophysics.

| | |
|---|---|
| BME552 (Spring 2016) | 1 lecture |
| BME552 (Spring 2015) | 1 lecture |
| BME552 (Spring 2014) | 1 lecture |
| BME552 (Spring 2013) | 1 lecture |
| BME552 (Spring 2012) | 1 lecture |
| NEUR524 (Fall 2011) | 2 lectures |
| BME680 (Spring 2008) | 1 lecture |
| BME552 (Spring 2007) | 1 lecture |
| NEUR524 (Fall 2007) | 1 lecture |
| BME680 (Spring 2006) | 3 lectures |
| BME502 (Spring 2004) | 7 lectures |
| BME 511 (Spring 2003) | 1 lecture |

**SEMINARS:**
Organized and presented full-day EONS Short Courses in June 2007 (Los Angeles, California) and March 2012 (Mulhouse, France). These short-courses are meant to (i) train the broader biomedical research community in the modeling and simulation methodologies developed by our resource center, (ii) inform researchers, educators and students of the possible use of these tools in education settings, and (iii) get feedback from the scientific community to remain in sync with its needs and provide directions for future potential developments.

## STUDENTS TRAINING

- Yumei Qiu (Master's student, Biomedical Engineering program, graduated in 2006).
  Project: Design and implementation of a framework for modular simulation of synaptic function and an underlying database for storage of models and simulation results.

- Sushmita Allam – PhD student (Biomedical Engineering program, graduation date: Dec. 2012)
  Dissertation: *Computational Investigation Of Glutamatergic Synaptic Dynamics: Role Of Ionotropic Receptor Distribution And Astrocytic Modulation Of Neuronal Spike Timing.*

- Eric Hu - PhD student (Biomedical Engineering program, expected graduation date: 2017)
  Project: Design and implementation of a non-parametric representation of the EONS integrated synaptic modeling platform.

- Adam Mergenthal - PhD student (Biomedical Engineering program, expected graduation date: unknown)
  Project: Alzheimer's Disease: From Molecular Dysfunctions to Macroscopic Observables.

- Pallavi Gunalan - PhD student (Biomedical Engineering program, expected graduation date: unknown)

- Mike Huang - Masters student (Biomedical Engineering program, graduated in May 2014)

Project: Optimization of CA1 pyramidal cell and synaptic parameters with respect to experimental results

- Zhuobo Feng - Masters student (Computer Science program, graduated in May 2015)
  Project: Development of a fully SBML-compatible synapse optimized for speed and Multiscale modeling capabilities

- Summer 2016:
  Joon Young Kim (Kevin): BME Masters student
  Project: Modeling effects of Amyloid beta on neurotransmitter release probability in hippocampal excitatory synapses.

  Shane Shang, undergraduate student (Fellowship from North Western University) – Collaboration still ongoing.
  Project: Modeling mitochondrial function and production of reactive oxidative species in health and neurodegeneration in hippocampal excitatory synapses.

- Spring 2015:
  Yuying Zhang and Jyotsna Venkatesh, MS CS Dept
  Devin Rousso and Christine Chen, Undergrad. CS Dept

- Summer 2015: Kristen Wang, undergraduate student (2 months internship)

- Numerous graduate and undergraduate rotation students from Neuroscience and Biomedical Engineering department

## WWW

Webmaster and sole contributor of http://synapticmodeling.com. This website advertises and distributes the EONS modeling and simulation platforms to hundreds of users worldwide since 2002.

## INVENTIONS

EONS synaptic modeling platform is copyrighted. An exclusive license has been purchased and maintained by RHENOVIA PHARMA since 2007.