Marwan Abdellah

Curriculum Vitæ

PERSONAL STATEMENT

About Me

Motivated and business-oriented researcher & software engineer with solid experience in 3D modeling, large-scale visualization, physically based rendering, neuroinformatics, computational biology, medical imaging and high performance computing. This comes with a proven track record in innovating and adapting business-driven ideas and transferring them into efficient, maintainable and scalable software solutions with powerful applications in industry and academia with 14 years of experience. Working in collaboration with multiple cross-functional teams with diverse interdisciplinary backgrounds to converge to the most optimum solution. PhD in Neuroscience from the Blue Brain Project at the École Polytechnique Fédéral de Lausanne (EPFL) with ambitions to simulate the mouse brain on supercomputers. AgilePM certificted.

EDUCATION

09.2012 — 09.2017

PH.D. · IN SILICO NEUROSCIENCE
Blue Brain Project · *Neuroscience Doctoral School* · *École Polytechnique Fédéral de Lausanne (EPFL)*
Lausanne · Switzerland
THESIS — *In Silico Brain Imaging*
RESEARCH SCOPE — *Bio-physically-based rendering and visualization of complex brain tissue models using computational modeling and simulation of optical microscopes.*
ADVISORS — *Henry Markram* · *Felix Schürmann*
MENTORS — *Ahmet Bilgili* · *Stefan Eilemann* · *Jean-Philippe Thiran*

09.2009 — 05.2012

M.SC. · BIOMEDICAL ENGINEERING
Systems & Biomedical Engineering Department · *School of Engineering* · *Cairo University*
Cairo · Egypt
THESIS — *High Performance Fourier Volume Rendering on Graphics Processing Units (GPUs)*
RESEARCH SCOPE — *Accelerating the generation of digitally-reconstructed radiographs (DRRs) on GPUs using Fourier slice theorem and frequency domain volume rendering.*
ADVISORS — *Ayman Eldeib* · *Amr Sharawi*

09.2004 — 05.2009

B.SC. · BIOMEDICAL ENGINEERING
Systems & Biomedical Engineering Department · *School of Engineering* · *Cairo University*
Cairo · Egypt
THESIS — *Software Development for Low Cost, High quality, Real-time, 4D Ultrasound on Personal Computers*
PROJECT SCOPE — *Investigating various rendering algorithms for accelerating 4D Ultrasound volume reconstruction on GPUs.*
ADVISOR — *Yasser Kadah*

EXPERIENCE & EMPLOYMENT HISTORY

07.2011 – Present

SCIENTIFIC VISUALIZATION EXPERT
* SENIOR VISUALIZATION RESEARCH ENGINEER (CURRENT)
* POST-DOCTROAL FELLOW
* DOCTORAL ASSISTANT
* VISUALIZATION SOFTWARE ENGINEER
Blue Brain Project · Computing Division · *École Polytechnique Fédéral de Lausanne (EPFL)*
Lausanne & Geneva · Switzerland
ROLE — *High performance and distributed visualization and automated generation of neuroscientific data.*
DIRECTOR — *Henry Markram* · PROJECT MANAGER & CO-DIRECTOR — *Felix Schürmann*
LEADS — *Stefan Eilemann* · *Samuel Lapere*

01.2013 – 10.2013

SOFTWARE ENGINEER
EPFL

Lausanne · Switzerland
Role — *Building automated grading and systematic evaluation workflows for C++ and JAVA courses offered by EPFL on Coursera.*
Instructors — *Jean-Cédric Chappelier · Vincent Lepetit · Jamila Sam*

07.2010 – 04.2011 **Research Intern**
SCI-STI-MM Multimedia Group · École Polytechnique Fédéral de Lausanne (EPFL)
Lausanne · Switzerland
Role — *Pursuing a research on H.264 and re-configurable video coding.*
Lab Director — *Marco Mattavilli*

03.2010 – 07.2010 **Associate Biomedical Software Engineer**
Biomedical Group · Symbyo Technologies (360imaging)
Cairo · Egypt
Role — *Development of dental implant software.*

07.2009 – 07.2010 **Instructor**
National Institute of Laser Advanced Sciences (NILES) · Cairo University
Cairo · Egypt
Role — *Instructing different topics of visualization and high performance computing.*

09.2009 – 02.2010 **Biomedical Software Engineer**
Research and Development Team · International Biomedical Engineering (IBE) Technologies
Cairo · Egypt
Role — *Development of 4D ultrasound reconstruction software.*

01.2005 – 09.2010 **Freelancer**
Web design

INTERESTS

Visualization	*Scientific visualization · Immersive visualization · VR · Distributed and scalable volume visualization*
Rendering	*Physically-based Monte Carlo volume rendering · Rendering highly scattering heterogeneous fluorescent media*
Neuroinformatics	*Neuronal, astroglial and vascular reconstruction, visualization and analysis*
HPC	*GPU computing (GPGPU) · Heterogeneous computing · Parallel and distributed computing*
Computational Geometry	*Reconstruction of high fidelity watertight polygonal meshes*
Medical Imaging	*High quality and high performance 3D/4D real-time volume reconstruction for medical data (CT, MRI and Ultrasound) · Digitally reconstructed radiograph generation with k-space volume rendering*

SELECTED PROJECTS

2022 — Present **Effective Skeletonization of Neuronal-Glial-Vascular (NGV) Structures**
Reconstruction of high quality morphological skeletons of neuroscientific models from segmented data including neurons, astroglial cells and large scale vascular networks.

2018 — Present **Reconstruction of High Fidelity Polygonal Mesh Models of Neuroscientific Data**
Reconstruction of accurate and watertight mesh models of neuroscientific structures including neurons, glial cells and blood vessels from point clouds acquired from optical microscopes and non-watertight meshes or volumetric stacks obtained by electron microscopes.

2013 — 2021 **Simulation of Optical Microscopy with Monte Carlo Rendering**
Simulation of the imaging pipelines in multiple optical microscopy techniques including brightfield and light sheet fluorescence microscopy.

2016 — 2020 **Physically-plausible Reconstruction of Volumetric Models of Neuronal Morphologies**

Automated reconstruction of accurate volumetric models of neocortical neuronal morphologies obtained from optical microscopes.

2015 — 2016 **Parallel Rendering of Large Scale Volumes on Distributed Heterogeneous Computing Platforms**
OpenCL-based, distributed rendering engine for visualizing large scale volumes on parallel multi-GPU remote machines.

2015 — 2016 **Physically-based Rendering of Highly Scattering Fluorescent Brain Models**
A novel rendering model for simulating light interaction with highly scattering fluorescent models based on a physically-plausible basis.

OPEN SOURCE CONTRIBUTIONS

2016 — Present **Ultraliser***
High performance large scale mesh and volume reconstruction of neuroscientific models.

2019 — Present **VessMorphoVis***
A Blender-based add-on for visual analysis of digital reconstructions of blood vessels morphological skeletons. The add-on is used to visualize, analyze large-scale vasculature graphs and create polygonal meshes and high quality renderings using Cycles.

2016 — Present **NeuroMorphoVis***
An interactive, extensible and cross-platform framework for building, visualizing and analyzing digital reconstructions of neuronal morphology skeletons extracted from microscopy stacks. The framework is capable of detecting, repairing tracing artifacts and generating high fidelity surface meshes and high resolution volumetric models for simulation and in silico *imaging studies.*

2015 — 2016 **Livre**
Large scale interactive parallel volume rendering engine.

2011 — 2015 **The Neocortical Microcircuit Collaboration Portal**
This portal provides an online public resource of the Blue Brain Project's first release of a digital reconstruction of the microcircuitry of juvenile Rat somatosensory cortex, access to experimental data sets used in the reconstruction, and the resulting models.

2011 — 2012 **Equalizer**
Equalizer is the standard middleware to create and deploy parallel OpenGL-based applications.

2012 **The Portable Hardware Locality (HWLOC)**
This software package provides a portable abstraction of the hierarchical topology of modern architectures, including NUMA memory nodes, sockets, shared caches, cores and simultaneous multithreading.

HONORS & AWARDS

October 2022 **École Polytechnique Fédéral de Lausanne (EPFL) Prime Speciale**
2000.0 CHF

July 2020 **International Society for Computational Biology (ISCB) Award**
Brain Vasculature - ISCB Art in Science Competition · Third Place

September 2019 **Ken Brodlie Prize · Eurographics UK Chapter**
Best Paper Award at CGVC 2019 · Generating High Fidelity Surface Meshes of Neocortical Neurons using Skin Modifiers

August 2019 **People's Choice Award from NeuroArt MBF Neuroscience**

USD 250.0 · The Neocortical Network

July 2019 — International Society for Computational Biology (ISCB) Award
Inside the Neocortex - ISCB Art in Science Competition · Honorable Mention.

July 2018 — International Society for Computational Biology (ISCB) Award
In Silico *Brainbow - ISCB Art in Science Competition · Third Place.*

October 2017 — École Polytechnique Fédéral de Lausanne (EPFL) Prime Speciale
1000.0 CHF

January 2010 — ITIDA Graduation Project Award
My graduation project was awarded the first place in 2009 from the Minsters of Higher Education and Tele-Communication in Egypt during a celebration that was organized by ITIDA.

June 2010 — NVIDIA Award · ICTP Summer School on HPC and Grid Computing
NVIDIA GeForce GTX 9800 GPU awarded as a prize for accelerating ultrasound volume rendering application in ICTP.

July 2009 — Distinction with Honor · B.Sc. Biomedical Engineering
Systems & Biomedical Engineering Department · Faculty of Engineering · Cairo University

GRANTS & FELLOWSHIPS

July 2020 — ISMB Fellowship
Intelligent Systems for Molecular Biology (ISMB) Fellowship Award 2020 of the International Society of Computational Biology (ISCB).

June 2018 — ISMB Fellowship
Travel award of USD 1000 to attend the Conference on Intelligent Systems for Molecular Biology (ISMB) in Chicago, USA.

September 2012 — Ph.D. Fellowship
Fully funded Ph.D. fellowship from the Blue Brain Project · École Polytechnique Fédéral de Lausanne (EPFL).

January 2011 — ICTP Grant
Travel award to attend the Advanced Workshop in High Performance Computing & Grid Computing in the International Center for Theoretical Physics (ICTP) in Trieste, Italy.

August 2009 — ICTP Grant
Travel award to attend the Advanced Workshop in High Performance Computing in the International Center for Theoretical Physics (ICTP) in Trieste, Italy.

January 2009 — ITIDA/ITAC Grant
Grant of USD 2000 from ITAC to support my graduation project.

TECHNICAL

Software Process	*Agile · Scrum · CI/CD · Jira · Git · GitLab · Doxygen*
Github	*github.com/marwan-abdellah*
Programming	*C/C++ 14, 17, 20 · Python · C# · Unix Shell · OOP · Design Patterns · TDD*
Libraries	*STL · Qt · Boost · Eigen · GLM*
Visualization	*Unreal Engine · Unity · OpenSceneGraph · OpenCV · VTK · OpenGL*
3D	*Blender (scripting with Python) · Maya (including MEL scripting) · 3DSMax*
Rendering	*PBRT · LuxRender · Mitsuba*

HPC	*CUDA · OpenCL · OpenMP · SLURM*
Web Development	*HTML · CSS · JavaScript*
Scientific Packages	*MATLAB · Octave*
Design & Web	*Gimp · Keynote · Inkscape*
Typography	*LaTeX · Microsoft Office*

PROFESSIONAL ACTIVITIES

CERTIFICATION

09.2023 — AgilePM® Foundation
APMG International

PROFESSIONAL MEMBERSHIPS

07.2023 — Present — Member
Venturelab

01.2010 — Present — Member
Institute of Electrical and Electronic Engineers (IEEE)

01.2010 — Present — Member
IEEE Engineering in Medicine and Biology Society (EMBS)

02.2015 — Present — Member
IEEE Engineering Computer Society

04.2015 — Present — Member
The European Association of Computer Graphics (Eurographics)

05.2015 — Present — Member
International Society for Computational Biology (ISCB)

CLASSES & TEACHING

July 2021 — Visual Communication through Schematic Graphics
Freie Universität Berlin
Topics — *Creating impactful figures for impactful publications!*

Spring 2014
Spring 2013 — Numerical Analysis · MATH–251
Life Sciences School · 4^{th} *Bachelor semester*
École Polytechnique Fédéral de Lausanne (EPFL)
Topics — *Stability, condition number and convergence of numerical methods · Polynomial interpolation and least squares approximation · Numerical integration · Direct methods for the solution of linear systems · Iterative methods for the solution of linear and nonlinear systems · Numerical approximation of ordinary differential equations · Introduction to MATLAB and Octave*
Lecturer — *Simone Deparis*

July 2010 — High Performance Computing
National Institute of Laser Advanced Sciences (NILES)
Topics — *Basic theory of HPC topics like Amdahl's law, speed up, UMA and NUMA architectures · GPU architecture · CUDA · Parallel algorithms*

October 2009 — Computer Graphics & Visualization
National Institute of Laser Advanced Sciences (NILES)
Topics — *OpenGL Pipeline · Surface rendering · Graphics Modeling using 3D Studio Max*

REVIEWER

February 2024	Briefings in Bioinformatics (Oxford Academic)
August 2023	Briefings in Bioinformatics (Oxford Academic)
January 2023	Engineering Applications of Artificial Intelligence (Elsevier)
December 2022	IEEE Transactions of Computational Imaging
July 2022	STAR Protocols (Cell Press)
June 2022	Frontiers in Neuroinformatics
December 2021	Frontiers in Surgery
August 2021	Neuroinformatics (Springer)
May 2021	STAR Protocols (Cell Press)
February 2021	IEEE Transactions on Visualization and Computer Graphics
February 2020	Frontiers in Neuroscience
July 2019	Journal of Electronic Imaging (SPIE)
February 2019	IEEE Transactions on Biomedical Engineering
December 2018	IEEE Transactions on Computational Imaging
April 2018	Journal of Electronic Imaging (SPIE)
February 2018	BMC Bioinformatics
January 2018	Journal of Electronic Imaging (SPIE)
February 2017	Journal of Medical Imaging (SPIE)
May 2016	Journal of Electronic Imaging (SPIE)
March 2016	Eurographics Symposium on Parallel Graphics & Visualization (EGPGV) 2016
January 2016	SoftwareX (Elsevier)
August 2015	Design Automation for Embedded Systems
July 2015	Computer Graphics Forum
March 2015	Eurographics Symposium on Parallel Graphics & Visualization (EGPGV) 2015
January 2014	Journal of Medical Imaging & Health Informatics
August 2012	IEEE, Cairo International Biomedical Engineering Conference (CIBEC) 2012

Attended Events, Conferences & Workshops

October 2023	Blender Conference (BCON) 2023 *Amsterdam · Netherlands*
September 2022	Eurographics Computer Graphics & Visual Computing (CGVC) 2022 *Leeds · UK*
July 2021	Biological Data Visualization (BioVis 2021) at ISMB ECCB 2021 *Virtual Conference*
July 2020	Biological Data Visualization (BioVis 2020) at ISMB 2020 *Virtual Conference*
October 2019	Blender Conference (BCON) 2019 (Scientific Visualization Panel) *Amsterdam · Netherlands*
September 2019	Eurographics Computer Graphics & Visual Computing (CGVC) 2019 (Session Chair) *Bangor · Wales · UK*
July 2019	Biological Data Visualization (BioVis 2019) at ISMB ECCB 2019 *Basel · Switzerland*
July 2018	8th Workshop on Biological Data Visualization (BioVis 2018) at ISMB 2018 *Chicago IL · USA*
March 2018	The 9th international meeting on Visualizing Biological Data (VIZBI 2018) *Boston · Cambridge MA · USA*

October 2017 — The Human Brain Project Summit
Glasgow · Scotland · UK

September 2017 — NeuroBridges · A Mediterranean, Middle Eastern Summer School in Computational Neuroscience
France

July 2017 — 7th Workshop on Biological Data Visualization (BioVis 2017) at ISMB 2017
Prague · Czechia

October 2016 — 6th Workshop on Biological Data Visualization (BioVis 2016) at IEEE VIS 2016
Baltimore · MD · USA

May 2016 — The Brain Forum
Lausanne · Switzerland

May 2016 — Eurographics 2016
Lisbon · Portugal

April 2016 — 37th International Symposium on Biomedical Imaging: From Nano to Macro (ISBI 2016)
Prague · Czech Republic

October 2015 — The Second Biomedical Engineering Workshop (Organizer)
Systems & Biomedical Engineering Department · School of Engineering · Cairo University · Cairo · Egypt

October 2015 — The 2nd IEEE EMBS International Students Conference (Keynote)
Cairo · Egypt

September 2015 — The Human Brain Project Summit
Madrid · Spain

August 2015 — 37th International Conference of the IEEE EMB Society (EMBC 2015)
Milan · Italy

July 2015 — 5th Symposium on Biological Data Visualization (BioVis 2015) at ISMB/ECCB 2015
Dublin · Ireland

May 2015 — Eurographics 2015
Zürich · Switzerland

March 2015 — The Brain Forum
Lausanne · Switzerland

December 2014 — IEEE, 7th Cairo International Biomedical Engineering Conference (CIBEC 2014)
Cairo · Egypt

December 2013 — The Brain Forum
Jeddah · The Kingdom of Saudi Arabia

October 2013 — The Human Brain Project Summit
École Polytechnique Fédéral de Lausanne (EPFL) · Lausanne · Switzerland

December 2012 — The First Biomedical Engineering Workshop (Organizer)
Biomedical Engineering Department · School of Engineering · Cairo University · Cairo · Egypt

December 2012 — IEEE, 6th Cairo International Biomedical Engineering Conference (CIBEC 2012)
Cairo · Egypt

November 2012 — Brain Mind Institute (BMI) Retreat Meeting
Bex · VD · Switzerland

April 2011 — Advanced School in High Performance Computing & Grid Computing
International Center for Theoretical Physics (ICTP) · Trieste · Italy

November 2009 — Advanced School in High Performance Computing
International Center for Theoretical Physics (ICTP) · Trieste · Italy

November 2009 — IEEE, International Conference of Image Processing (ICIP 2009)
Cairo · Egypt

March 2009 — URSI, 26th National Radio Science Conference (NRSC)
Cairo · Egypt

December 2008 — IEEE, 4th Cairo International Biomedical Engineering Conference (CIBEC 2008)
Cairo · Egypt

OTHER INFORMATION

PERSONAL

Residence	Permit C · *Crissier VD · Switzerland*
Work Address	*Campus Biotech · Chemin des Mines, 9 · Geneva · CH-1202 · Switzerland*
HomePage	*www.marwan-abdellah.com*
Emails	*abdellah.marwan@gmail.com · marwan.abdellah@epfl.ch*
Languages	English — *Fluent* · French — *Very Good (B1 FIDE, B2 Berlitz)* Italian · Spanish · German — *Learning* Arabic — *Mother-tongue*

PUBLICATIONS

JOURNAL ARTICLES UNDER REVIEW

March 2024

1. SYNTHESIS OF GEOMETRICALLY REALISTIC AND WATERTIGHT NEURONAL ULTRASTRUCTURE MANIFOLDS FOR *in silico* MODELING
Briefing in Bioinformatics
AUTHORS — ***Marwan Abdellah***, *Alessandro Foni, Juan José García Cantero, Nadir Román Guerrero, Elvis Boci, Adrien Fleury, Jay S. Coggan, Daniel Keller, Judit Planas, Jean-Denis Courcol, and Georges Khazen*

PEER-REVIEWED JOURNAL ARTICLES

In press

2. GENOME-WIDE ANALYSIS OF THE DYNAMIC AND BIOPHYSICAL PROPERTIES OF CHROMATIN AND NUCLEAR PROTEINS IN LIVING CELLS WITH Hi-D
Nature Protocols
AUTHORS — *Cesar Augusto Valades-Cruz, Roman Barth,* ***Marwan Abdellah****, and Haitham Shaban*

January 2023

2. ULTRALISER: A FRAMEWORK FOR CREATING MULTISCALE, HIGH-FIDELITY AND GEOMETRICALLY REALISTIC 3D MODELS FOR *in silico* NEUROSCIENCE
Briefing in Bioinformatics
AUTHORS — ***Marwan Abdellah***, *Juan José García Cantero, Nadir Román Guerrero, Alessandro Foni, Jay S. Coggan, Corrado Calì, Marco Agus, Eleftherios Zisis, Daniel Keller, Markus Hadwiger, Pierre J. Magistretti, Henry Markram, Felix Schürmann*

March 2023

3. THALAMIC CONTROL OF SENSORY PROCESSING AND SPINDLES IN A BIOPHYSICAL SOMATOSENSORY THALAMORETICULAR CIRCUIT MODEL OF WAKEFULNESS AND SLEEP
Cell
AUTHORS — *Elisabetta Iavarone, Jane Simko, Ying Shi, Marine Bertschy, María García-Amado, Polina Litvak, Anna-Kristin Kaufmann, Christian O'Reilly, Oren Amsalem,* ***Marwan Abdellah****, Grigori Chevtchenko, Benoît Coste, Jean-Denis Courcol, András Ecker, Cyrille Favreau, Adrien Christian Fleury, Werner Van Geit, Michael Gevaert, Nadir Román Guerrero, Joni Herttuainen, Genrich Ivaska, Samuel Kerrien, James G King, Pramod Kumbhar, Patrycja Lurie, Ioannis Magkanaris, Vignayanandam Ravindernath Muddapu, Jayakrishnan Nair, Fernando L Pereira, Rodrigo Perin, Fabien Petitjean, Rajnish Ranjan, Michael Reimann, Liviu Soltuzu, Mohameth François Sy, M Anıl Tuncel, Alexander Ulbrich, Matthias Wolf, Francisco Clascá, Henry Markram, Sean L Hill*

June 2022

4. A CALCIUM-BASED PLASTICITY MODEL FOR PREDICTING LONG-TERM POTENTIATION AND DEPRESSION IN THE NEOCORTEX
Nature Communications
AUTHORS — *Giuseppe Chindemi,* ***Marwan Abdellah****, Oren Amsalem, Ruth Benavides-Piccione, Vincent Delattre, Michael Doron, Andras Ecker, Aurélien T. Jaquier, James King, Pramod Kumbhar, Caitlin Monney, Rodrigo Perin, Christian Rössert, Anil M Tuncel, Werner Van Geit, Javier DeFelipe, Michael Graupner, Idan Segev, Henry Markram and Eilif B. Muller*

September 2022

5. LARGE-DEPTH THREE-PHOTON FLUORESCENCE MICROSCOPY IMAGING OF CORTICAL MICROVASCULATURE ON NONHUMAN PRIMATES WITH BRIGHT AIE PROBE IN VIVO
Biomaterials
AUTHORS — *Hequn Zhang, Peng Fu, Yin Liu, Zheng Zheng, Liang Zhu, Mengqi Wang,* ***Marwan Abdellah****, Mubin He, Jun Qian, Anna Wang Roe, Wang Xi*

August 2021

6. DIGITAL RECONSTRUCTION OF THE NEURO-GLIA-VASCULAR ARCHITECTURE
Oxford Cerebral Cortex
AUTHORS — *Eleftherios, Zisis, Daniel Keller, Lida Kanari, Alexis Arnaudon, Michael Gevaert, Thomas Delemontex, Benoît Coste, Alessandro Foni,* ***Marwan Abdellah****, Corrado Cali, Kathryn Hess, Felix Schürmann and Henry Markram*

July 2021

7. METABALL SKINNING OF SYNTHETIC ASTROGLIAL MORPHOLOGIES INTO REALISTIC MESH MODELS FOR VISUAL ANALYTICS AND *in silico* SIMULATIONS

Oxford Bioinformatics
Authors — ***Marwan Abdellah***, *Alessandro Foni, Eleftherios Zisis, Nadir Román Guerrero, Samuel Lapere, Jay S. Coggan, Daniel Keller, Henry Markram, and Felix Schürmann*

July 2021

8. *In silico* voltage-sensitive dye imaging reveals the emergent dynamics of cortical populations
Nature Communications
Authors — *Taylor H. Newton, Michael W. Reimann,* ***Marwan Abdellah****, Grigori Chevtchenko, Eilif B. Muller and Henry Markram*

July 2020

9. Interactive visualization and analysis of morphological skeletons of brain vasculature networks with VessMorphoVis
Oxford Bioinformatics
Authors — ***Marwan Abdellah****, Nadir Román Guerrero, Samuel Lapere, Jay S. Coggan, Daniel Keller, Benoit Coste, Snigdha Dagaer, Jean-Denis Courcol, Henry Markram, and Felix Schürmann*

January 2019

10. Objective morphological classification of neocortical pyramidal cells
Oxford Cerebral Cortex
Authors — *Lida Kanari, Srikanth Ramaswamy, Ying Shi, Sebastien Morand, Julie Meystre, Rodrigo Perin ,* ***Marwan Abdellah****, Yun Wang, Kathryn Hess and Henry Markram*

September 2018

11. A process for digitizing and simulating biologically realistic oligocellular networks demonstrated for the Neuro-Glio-Vascular ensemble
Frontiers in Neuroscience
Authors — *Jay S. Coggan, Corrado Cali, Daniel Keller, Marco Agus, Daniya Boges,* ***Marwan Abdellah****, Kalpana Kare, Heikki O. Lehvaslaiho, Stefan Eilemann, Renaud B. Jolivet, Markus Hadwiger, Henry Markram, Felix Schürmann, Pierre J. Magistretti*

June 2018

12. NeuroMorphoVis: a collaborative framework for visualization and analysis of neuronal morphology skeletons reconstructed from microscopy stacks
Oxford Bioinformatics
Authors — ***Marwan Abdellah****, Juan Hernando, Stefan Eilemann, Samuel Lapere, Nicolas Antille, Henry Markram, and Felix Schürmann*

September 2017

13. Reconstruction and visualization of large-scale volumetric models of neocortical circuits for physically-plausible *in silico* optical studies
BMC Bioinformatics 2017
Authors — ***Marwan Abdellah****, Juan Hernando, Nicolas Antille, Stefan Eilemann, Henry Markram, and Felix Schürmann*

February 2017

14. Bio-physically plausible visualization of highly scattering fluorescent neocortical models for *in silico* experimentation
BMC Bioinformatics 2017 · Volume 18 · Supplement 2:62
Authors — ***Marwan Abdellah****, Ahmet Bilgili, Stefan Eilemann, Julian Shillcock, Henry Markram, and Felix Schürmann*

October 2015

15. Reconstruction and Simulation of Neocortical Microcircuitry
Cell
Authors — *Henry Markram, Eilif Muller, Srikanth Ramaswamy, Michael W. Reimann,* ***Marwan Abdellah****, Carlos Aguado Sanchez, Anastasia Ailamaki, Lidia Alonso Nanclares, Nicolas Antille, Selim Arsever, Guy Antoine Atenekeng Kahou, Thomas K. Berger, Ahmet Bilgili, Nenad Buncic, Athanassia Chalimourda, Giuseppe Chindemi, Jean-Denis Courcol, Fabien Delalondre, Vincent Delattre, Shaul Druckmann, Raphael Dumusc, James Dynes, Stefan Eilemann, Eyal Gal, Michael Emiel Gevaert, Jean-Pierre Ghobril, Albert Gidon, Joe W. Graham, Valentin Haenel, Etay Hay, Thomas Heinis, Juan B. Hernando, Michael Hines, Lida Kanari, Daniel Keller, John Kenyon, Georges Khazen, Yihwa Kim, James G. King, Zoltan Kisvarday, Pramod Kumbhar, Sebastien Lasserre, Bruno R.C. Magalhaes, Angel Merchán-Pérez, Julie Meystre, Benjamin Roy Morrice, Jeffrey Muller, Alberto Munoz-Cespedes, Shruti Muralidhar, Keerthan Muthurasa, Daniel Nachbaur, Taylor H. Newton, Max Nolte, Aleksandr Ovcharenkov, Juan Palacios, Luis Pastor, Rodrigo Perin, Rajnish Ranjan, Imad Riachi, José-Rodrigo Rodríguez, Roman Juan Luis Riquelme, Christian Andreas Rössert, Ying Shi, Julian C. Shillcock, Ricardo Silva, Farhan*

Tauheed, Martin Telefont, Maria Toledo-Rodriguez, Thomas Tränkler, Werner Van Geit, Jafet Villafranca Diaz, Richard Walker, Yun Wang, Stefano M. Zaninetta, Javier DeFelipe, Sean L. Hill, Idan Segev and Felix Schürmann

August 2015 — 16. The Neocortical Microcircuit Collaboration Portal: A Resource for Rat Somatosensory Cortex
Frontiers in Neural Circuits
Authors — *Srikanth Ramaswamy, Jean-Denis Courcol, **Marwan Abdellah**, Stanislaw Adaszewski, Nicolas Antille, Selim Arsever, Atenekeng Kahou Guy Antoine, Ahmet Bilgili, Yury Brukau, Giuseppe Chindemi, Raphael Dumusc, Stefan Eilemann, Lida Kanari, Daniel Keller, James G. King, Rajnish Ranjan, Michael Wolfgang Reimann, Christian Roessert, Martin Telefont, Werner Van Geit, Jafet Villafranca Diaz, Richard Walker, Yun Wang, Stefano Zaninetta, Javier DeFelipe, Sean L Hill, Jeffrey Muller, Idan Segev, Felix Schürmann, Eilif Benjamin Muller and Henry Markram*

August 2015 — 17. Physically-based *in silico* light sheet microscopy for visualizing fluorescent brain models
BMC Bioinformatics 2015 · Volume 16 · Supplement 11:S8
Authors — ***Marwan Abdellah**, Ahmet Bilgili, Stefan Eilemann, Henry Markram, and Felix Schürmann*

January 2015 — 18. High Performance GPU-based Fourier Volume Rendering
International Journal of Biomedical Imaging · Article ID 590727
Authors — ***Marwan Abdellah**, Ayman Eldeib and Amr Sharawi*

Conference Proceedings

September 2022 — 19. Meshing of Spiny Neuronal Morphologies using Union Operators
EG Computer Graphics & Visual Computing (CGVC) 2022 · Leeds, UK
Authors — ***Marwan Abdellah**, Juan José García Cantero, Alessandro Foni, Nadir Román Guerrero, Elvis Boci, and Felix Schürmann*

October 2019 — 20. High fidelity visualization of large scale digitally reconstructed brain circuitry with signed distance functions
IEEE Visualization Conference (IEEE Vis 2019) · Vancouver, Canada
Authors — *Jonas Karlsson, **Marwan Abdellah**, Sebastien Speierer, Alessandro Foni, Samuel Lapere, and Felix Schürmann*

September 2019 — 21. Generating High Fidelity Surface Meshes of Neocortical Neurons using Skin Modifiers
EG Computer Graphics & Visual Computing (CGVC) 2019 · Bangor, Wales, UK
Authors — ***Marwan Abdellah**, Cyrille Favreau, Juan Hernando, Samuel Lapere, and Felix Schürmann*

October 2017 — 22. From Big Data to Big Displays High-Performance Visualization at Blue Brain
International Conference on High Performance Computing, ISC High Performance 2017 · Frankfurt, Germany
Authors — *Stefan Eilemann, **Marwan Abdellah**, Nicolas Antille, Ahmet Bilgili, Grigory Chevtchenko, Raphael Dumusc, Cyrille Favreau, Juan Hernando, Daniel Nachbaur, Pawel Podhajski, Jafet Villafranca and Felix Schürmann*

August 2016 — 23. Efficient Rendering of Digitally Reconstructed Radiographs on Heterogeneous Computing Architectures using Central Slice Theorem
38th *Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS) (EMBC 2016) · Orlando, FL, USA*
Authors — ***Marwan Abdellah**, Mohamed Abdallah, Mohamed Alzanati, and Ayman M. Eldeib*

August 2016 — 24. Parallel Generation of Digitally Reconstructed Radiographs on Heterogeneous Multi-GPU Workstations
38th *Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS) (EMBC 2016) · Orlando, FL, USA*
Authors — ***Marwan Abdellah**, Asem Abdelaziz, Eslam Ali, Sherief Abdelaziz, Abdelrahman Sayed, Mohamed I. Owis, and Ayman M. Eldeib*

May 2016 — 25. Physically-based Rendering of Highly Scattering Fluorescent Solutions using Path Tracing

Eurographics 2016 · Lisbon, Portugal
Authors — ***Marwan Abdellah***, *Ahmet Bilgili, Stefan Eilemann, Henry Markram, and Felix Schürmann*

April 2016 26. Interactive High Resolution Reconstruction of 3D Ultrasound Volumes on the GPU
2016 IEEE International Symposium on Biomedical Imaging: From Nano to Macro · Prague, Czech Republic
Authors — ***Marwan Abdellah***, *Asem Abdelaziz, and Ayman M. Eldeib*

April 2016 27. Optimized GPU-accelerated Framework for X-ray Rendering using *k*-space Volume Reconstruction
XIV Mediterranean Conference on Medical & Biological Engineering & Computing (MEDICON 2016) · Paphos, Cyprus
Authors — ***Marwan Abdellah***, *Yassin Amer, and Ayman Eldeib*

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Authors — ***Marwan Abdellah***, *Ayman M. Eldeib, and Mohamed Owis*

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Authors — ***Marwan Abdellah***, *Ahmet Bilgili, Stefan Eilemann, Henry Markram, and Felix Schürmann*

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Authors — ***Marwan Abdellah***, *Ahmet Bilgili, Stefan Eilemann, Henry Markram, and Felix Schürmann*

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Authors — ***Marwan Abdellah***, *Ayman Eldeib and Amr Sharawi*

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Authors — ***Marwan Abdellah***, *Ayman Eldeib and Amr Sharawi*

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Proceedings of the High Performance Computing Symposium (HPC '14), Article No. 5 · Tampa, FL, USA
Authors — ***Marwan Abdellah***

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IEEE, Proceedings of the 6th *Cairo International Biomedical Engineering Conference (CIBEC 2012) · Cairo, Egypt*
Authors — ***Marwan Abdellah***, *Ayman Eldeib and Amr Shaarawi*

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IEEE, Proceedings of the 6th Cairo International Biomedical Engineering Conference (CIBEC 2012) · Cairo, Egypt
Authors — *Salah Saleh, **Marwan Abdellah**, Ahmed A. Abdel Raouf and Yasser M. Kadah*

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38. Parallel Rendering on Hybrid Multi-GPU Clusters
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Authors — *Stefan Eilemann, Ahmet Bilgili, **Marwan Abdellah**, Juan Hernando, Maxim Makhinya, Renato Pajarola, and Felix Schürmann*

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39. GPU-Based Reconstruction and Display for 4D Ultrasound Data
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Authors — *Ahmed Elnokrashy, Ahmed Elmalky, Tamer Hosny, **Marwan Abdellah**, Alaa Megawer, Abubakr Alsebai, Abou-Bakr Youssef and Yasser Kadah*

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40. Software Development for Low Cost, High quality, Real-time, 4D Ultrasound on Personal Computers
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Authors — ***Marwan Abdellah** ,Alaa Megawer and Yasser M. Kadah*

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August 2023

41. Sparse and specific long-term plasticity emerge without homeostasis in a biophysically detailed cortical model
bioRxiv (Under review in Neuron)
Authors — *Andras Ecker, Daniela Egas Santander, **Marwan Abdellah**, Jorge Blanco Alonso, Sirio Bolanos-Puchet, Giuseppe Chindemi, James B. Isbister, James Gonzalo King, Pramod Kumbhar, Ioannis Magkanaris, Eilif B. Muller, Michael W. Reimann*

May 2023

42. Community-based Reconstruction and Simulation of a Full-scale Model of Region CA1 of Rat Hippocampus
bioRxiv (Under review in PLOS Biology)
Authors — *Armando Romani, Alberto Antonietti, Davide Bella, Julian Budd, Elisabetta Giacalone, Kerem Kurban, Sara Saray, **Marwan Abdellah**, Alexis Arnaudon, Elvis Boci, Cristina Colangelo, Jean-Denis Courcol, Thomas Delemontex, Andras Ecker, Joanne Falck, Cyrille Favreau, Michael Gevaert, Juan B. Hernando, Joni Herttuainen, Genrich Ivaska, Lida Kanari, Anna-Kristin Kaufmann, James Gonzalo King, Pramod Kumbhar, Sigrun Lange, Huanxiang Lu, Carmen Alina Lupascu, Rosanna Migliore, Fabien Petitjean, Judit Planas, Pranav Rai, Srikanth Ramaswamy, Michael W Reimann, Juan Luis Riquelme, Nadir Roman Guerrero, Ying Shi, Vishal Sood, Mohameth Francois Sy, Werner Van Geit, Liesbeth Vanherpe, Tamas Freund, Audrey Mercer, Eilif Muller, Felix Schurmann, Alex M Thomson, Michele Migliore, Szabolcs Káli, Henry Markram*

August 2022

43. Ultraliser: a framework for creating multiscale, high-fidelity and geometrically realistic 3D models for *in silico* neuroscience
bioRxiv (Published in Briefing in Bioinformatics)
Authors — ***Marwan Abdellah**, Juan José García Cantero, Nadir Román Guerrero, Alessandro Foni, Jay S. Coggan, Corrado Calì, Marco Agus, Eleftherios Zisis, Daniel Keller, Markus Hadwiger, Pierre J. Magistretti, Henry Markram, Felix Schürmann*

January 2022

44. Reconstruction and Simulation of Thalamoreticular Microcircuitry
bioRxiv (Published in Cell)
Authors — *Elisabetta Iavarone, Jane Simko, Ying Shi, Marine Bertschy, María García-Amado, Polina Litvak, Anna-Kristin Kaufmann, Christian O'Reilly, Oren Amsalem, **Marwan Abdellah**, Grigori Chevtchenko, Benoît Coste, Jean-Denis Courcol, András Ecker, Cyrille Favreau, Adrien Christian Fleury, Werner Van Geit, Michael Gevaert, Nadir Román Guerrero, Joni Herttuainen, Genrich Ivaska, Samuel Kerrien, James G King, Pramod Kumbhar, Patrycja Lurie, Ioannis Magkanaris, Vignayanandam Ravindernath Muddapu, Jayakrishnan Nair, Fernando L Pereira, Rodrigo Perin, Fabien Petitjean, Rajnish Ranjan, Michael Reimann, Liviu Soltuzu, Mohameth François Sy, M Anıl Tuncel, Alexander Ulbrich, Matthias Wolf, Francisco Clascá, Henry Markram, Sean L Hill*

January 2021

45. Architecture of the Neuro-Glia-Vascular System
bioRxiv (Published in Cerebral Cortex)
Authors — *Eleftherios, Zisis, Daniel Keller, Lida Kanari, Alexis Arnaudon, Michael Gevaert, Thomas*

*Delemontex, Benoît Coste, Alessandro Foni, **Marwan Abdellah**, Corrado Cali, Kathryn Hess, Felix Schürmann and Henry Markram*

January 2020 — 46. A calcium-based plasticity model predicts long-term potentiation and depression in the neocortex
bioRxiv (Published in Nature Communications)
Authors — *Giuseppe Chindemi, **Marwan Abdellah**, Oren Amsalem, Ruth Benavides-Piccione, Vincent Delattre, Michael Doron, Andras Ecker, James Gonzalo King, Pramod Kumbhar, Caitlin Claire Monney, Rodrigo Perin, Christian Rössert, Werner Van Geit, Javier DeFelipe, Michael Graupner, Idan Segev, Henry Markram, Eilif Benjamin Müller*

October 2019 — 47. Voltage-sensitive dye imaging reveals inhibitory modulation of ongoing cortical activity
bioRxiv (Published in Nature Communications)
Authors — *Taylor H Newton, **Marwan Abdellah**, Grigori Chevtchenko, Eilif B Muller, Henry Markram*

January 2018 — 48. Objective Classification of Neocortical Pyramidal Cells
bioRxiv (Published in Cerebral Cortex)
Authors — *Lida Kanari, Srikanth Ramaswamy, Ying Shi, Sebastien Morand, Julie Meystre, Rodrigo Perin, **Marwan Abdellah**, Yun Wang, Kathryn Hess, Henry Markram*

January 2018 — 49. A physically plausible model for rendering highly scattering fluorescent participating media
arXiv.org
Authors — ***Marwan Abdellah**, Ahmet Bilgili, Stefan Eilemann, Henry Markram, Felix Schürmann*

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July 2019 — 50. Advances in Neuronal Morphology Analysis, Meshing and Visualization with NeuroMorphoVis
Biological Data Visualization at International Society of Molecular Biology (ISMB) · Basel, Switzerland
Authors — ***M. Abdellah**, Samuel Lapere, F. Schürmann, H. Markram*

November 2016 — 51. Characterization of Detection Iso-contours in a Single Fiber Photometry System
2017 Society for Neuroscience (SFN) Meeting · Washington DC, USA
Authors — *M. Mansy, **M. Abdellah**, H. Kim, F. Schürmann and K. Oweiss*

July 2017 — 52. Reconstruction and visualization of large-scale volumetric models of neocortical circuits for physically plausible *in silico* optical studies
5th Symposium of Biological Data Visualization · Prague, Czech Republic
Authors — ***M. Abdellah**, Stefan Eilemann, Juan Hernando, F. Schürmann, H. Markram*

November 2016 — 53. *In silico* voltage sensitive dye imaging in a digital reconstruction of somatosensory cortex
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Authors — *T. H. Newton, **M. Abdellah**, E. Muller, F. Schürmann, H. Markram*

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Authors — *F. Delalondre, **M. Abdellah**, C. Aguado Sanchez, A. Bilgili, N. Buncic, J.-D. Courcol, S. Eilemann, V. Haenel, S. L. Hill, T. Heunus, J. B. Hernando, M. Hines, J. G. King, E. Muller, B. R. C. Magalhaes, G. Mateescu, J. Muller, K. Murthurasa, D. Nachbaur, L. Pastor, J. M. Pena, R. Ranjan, M. W. Reimann, F. Tauheed, W. Van Geit, A. Ailamaki, H. Markram, F. Schürmann*

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February 2015 — 55. Computational Models and Simulators of functional MRI
A literature review report submitted to Prof. Rolf Gruetter · Neuroscience Doctoral School · École Polytechnique

Fédéral de Lausanne (EPFL) · *Lausanne* · *Switzerland*
Authors — ***Marwan Abdellah***

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September 2017

56. *In Silico* Brain Imaging: Physically-plausible Methods for Visualizing Neocortical Microcircuitry
Ph.D. Thesis · *Blue Brain Project* · *Neuroscience Doctoral School* · *École Polytechnique Fédéral de Lausanne (EPFL)* · *Lausanne, Switzerland*
Authors — ***Marwan Abdellah***

February 2012

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M.Sc. Thesis · *Systems & Biomedical Engineering Department, School of Engineering, Cairo University* · *Cairo, Egypt*
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May 1, 2024