Marwan Abdellah *Vitæ*

Senior Software Engineer · Visualization Expert · Neuroinformatician · Art in Science

Personal Statement

About Me

A results-driven, proactive, and business-oriented Senior Software & Research Engineer with over 14 years of expertise in 3D modeling, large-scale visualization, physically based rendering, neuroinformatics, computational biology, medical imaging, and high-performance computing. Proven track record of translating business-driven ideas into scalable, efficient software solutions with significant impact in both academia and industry. Collaborating with cross-functional teams across diverse interdisciplinary domains. Holds a PhD in Neuroscience from the Blue Brain Project of the École Polytechnique Fédéral de Lausanne (EPFL), with the focus on simulating the mouse brain using supercomputers. AgilePM certified.

Education

09.2012 — 09.2017

Ph.D. Neuroscience

Blue Brain Project · Neuroscience Doctoral School · École Polytechnique Fédéral de Lausanne (EPFL)

Lausanne · Switzerland

Thesis — *In Silico Brain Imaging : physically-plausible methods for visualizing neocortical microcircuitry*

Research Scope — *Computational modeling of optical microscopy pipelines that are capable of visualizing digitally reconstructed cortical tissue models on a bio-physically plausible basis by simulating light interaction with optically aware brain models.*

Topics — *Neuroscience · Neuroinformatics · Visualization · Rendering · Computational Geometry*

Major Contributions — *NeuroMorphoVis · Ultraliser*

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 CUDA-capable GPUs using Fourier slice theorem and frequency domain volume rendering.*

Topics — *Medical Imaging · Visualization · Image Reconstruction · HPC · GPU Computing · CUDA*

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 — *Implementing rendering algorithms for realtime 4D Ultrasound volume reconstruction on GPUs using vertex and fragment shaders.*

Advisor — *Yasser Kadah*

Experience & Employment History

07.2011 – 12.2024

Visualization Engineer & Neuroinformatician

* Senior Visualization Research Engineer (04.2020 - 12.2024)
* Visualization Engineer (10.2018 - 03.2020)
* Post-doctroal Fellow (09.2017 - 09.2018)
* Doctoral Assistant (09.2012 – 09.2017)
* Visualization Software Engineer (07.2011 – 09.2012)

Blue Brain Project · Computing Division · École Polytechnique Fédéral de Lausanne (EPFL)

EPFL Campus in Lausanne & Campus Biotech in Geneva · Switzerland

Roles — *Software Engineering · Visualization, Mesh Generation & Neuroinformatics Research · Art in Science*

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 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 research on H.264 and reconfigurable video coding using OpenDF and CAL.*
Lab Director — *Marco Mattavilli* · Supervisor — *Ihab Amer*

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, computer graphics and high performance computing to post-graduate students.*

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
Consultant for web and graphics design projects.

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*
Geometry	*Reconstruction of high fidelity watertight polygonal meshes*
Medical Imaging	*High performance real-time volume reconstruction of medical data (CT, MRI and US)*

SELECTED PROJECTS

2022 — Present

Effective Skeletonization of Neuronal-Glial-Vascular (NGV) Structures
Reconstruction of high quality morphological skeletons of neuroscientific models from segmented electron microscopy data including neurons, dendritic spines, 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 neurons, glial cells and blood vessels from point clouds acquired from optical microscopes and non-watertight meshes or volumetric stacks obtained by optical and electron microscopy.

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 optically aware volumetric models of cortical neuronal morphologies segmented with optical microscopes.

2015 — 2016

Rendering of Large Scale Volumes on Distributed Heterogeneous Computing Platforms
OpenCL-based, parallel and distributed rendering engine for visualizing volumes on multi-GPU architectures.

2015 — 2016

Physically-based Rendering of Highly Scattering Fluorescent Brain Models
A novel model for simulating light interaction with highly scattering fluorescent volumes using physically based rendering.

OPEN SOURCE CONTRIBUTIONS

2016 — Present

Ultraliser*
Scalable C++-based software framework cabale of reconstructing morphological models, polygonal meshes and large scale volume of neuroscientific models from various input data types.

2019 — Present

VessMorphoVis*
A Blender-based add-on for visual analysis of digital reconstructions of morphologies of blood vessels. The add-on is used to visualize, analyze vasculature graphs and create corresponding 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. 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

09.2024 — Present — Member
Project Management Institute (PMI)

05.2024 — Present — Member
Society for Neuroscience

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 · 4th *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 2024 Society for Neuroscience Meeting (*SfN*) 2024
Chicago IL · USA

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 — *Lausanne · Switzerland*

Work Address *Campus Biotech · Chemin des Mines, 9 · Geneva · CH-1202 · Switzerland*
HomePage *www.marwan-abdellah.com*
Email *abdellah.marwan@gmail.com*
Languages English — *Fluent* · French — *Very Good (B2)*
Italian · Spanish · German — *Learning*
Arabic — *Mother-tongue*

PUBLICATIONS

PEER-REVIEWED JOURNAL ARTICLES

September 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*

August 2024

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

July 2024

3. STRUCTURAL AND MOLECULAR CHARACTERIZATION OF ASTROCYTE AND VASCULATURE CONNECTIVITY IN THE MOUSE HIPPOCAMPUS AND CORTEX
GLIA
AUTHORS — *Charlotte Lorin, Romain Guiet, Nicolas Chiaruttini, Giovanna Ambrosini, Elvis Boci,* ***Marwan Abdellah****, Henry Markram, Daniel Keller*

January 2023

4. 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

5. 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

6. 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

7. 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

8. 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

9. 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

10. *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

11. 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

12. 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

13. 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

14. 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

15. 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

16. 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

17. 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

18. 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

19. 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

20. 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

21. 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

22. 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

23. 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

24. 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

25. 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

26. 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

27. 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

28. 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

29. 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*

August 2015

30. Accelerating DRR Generation Using Fourier Slice Theorem on the GPU
37th *Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS) (EMBC 2015) · Milan, Italy*
Authors — ***Marwan Abdellah****, Ayman M. Eldeib, and Mohamed Owis*

August 2015

31. GPU Acceleration for Digitally Reconstructed Radiographs using Bindless Texture Objects and CUDA/OpenGL Interoperability
37th *Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS) (EMBC 2015) · Milan, Italy*
Authors — ***Marwan Abdellah****, Ayman M. Eldeib, and Mohamed Owis*

July 2015

32. Physically-based *in silico* light sheet microscopy for visualizing fluorescent brain models
5th *Symposium on Biological Data Visualization (BioVis 2015) · Dublin, Ireland*
Authors — ***Marwan Abdellah****, Ahmet Bilgili, Stefan Eilemann, Henry Markram, and Felix Schürmann*

May 2015

33. A Computational Model of Light-Sheet Fluorescence Microscopy using Physically-based Rendering
Eurographics 2015 · Zürich, Switzerland
Authors — ***Marwan Abdellah****, Ahmet Bilgili, Stefan Eilemann, Henry Markram, and Felix Schürmann*

December 2014

34. MATLAB-based Fourier Volume Rendering Framework
IEEE, Proceedings of the 7th Cairo International Biomedical Engineering Conference (CIBEC 2014) · Cairo, Egypt
Authors — ***Marwan Abdellah****, Ayman Eldeib and Amr Sharawi*

December 2014

35. Offline Large Scale Fourier Volume Rendering on Low-end Hardware

IEEE, Proceedings of the 7th Cairo International Biomedical Engineering Conference (CIBEC 2014) · Cairo, Egypt
Authors — ***Marwan Abdellah***, *Ayman Eldeib and Amr Sharawi*

April 2014

36. cufftShift: High Performance CUDA-accelerated FFT-shift Library
Proceedings of the High Performance Computing Symposium (HPC '14), Article No. 5 · Tampa, FL, USA
Authors — ***Marwan Abdellah***

December 2012

37. Constructing a Functional Fourier Volume Rendering Pipeline on Heterogeneous Platforms
IEEE, Proceedings of the 6th Cairo International Biomedical Engineering Conference (CIBEC 2012) · Cairo, Egypt
Authors — ***Marwan Abdellah***, *Ayman Eldeib and Amr Shaarawi*

December 2012

38. High Performance Multi-dimensional (2D/3D) FFT-Shift Implementation on Graphics Processing Units (GPUs)
IEEE, Proceedings of the 6th Cairo International Biomedical Engineering Conference (CIBEC 2012) · Cairo, Egypt
Authors — ***Marwan Abdellah***, *Ayman Eldeib and Amr Shaarawi*

December 2012

39. High Performance CUDA-based Implementation for the 2D Version of the Maximum Subarray Problem (MSP)
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*

May 2012

40. Parallel Rendering on Hybrid Multi-GPU Clusters
Eurographics Symposium on Parallel Graphics and Visualization (EGPGV'12) · Cagliari, Italy
Authors — *Stefan Eilemann, Ahmet Bilgili,* ***Marwan Abdellah***, *Juan Hernando, Maxim Makhinya, Renato Pajarola, and Felix Schürmann*

September 2009

41. GPU-Based Reconstruction and Display for 4D Ultrasound Data
2009 IEEE International Ultrasonics Symposium · Rome, Italy
Authors — *Ahmed Elnokrashy, Ahmed Elmalky, Tamer Hosny,* ***Marwan Abdellah***, *Alaa Megawer, Abubakr Alsebai, Abou-Bakr Youssef and Yasser Kadah*

March 2009

42. Software Development for Low Cost, High quality, Real-time, 4D Ultrasound on Personal Computers
IEEE, 26th National Radio Science Conference (NRSC), Union Radio Scientifique Internationale (URSI) · Cairo, Egypt
Authors — ***Marwan Abdellah*** *,Alaa Megawer and Yasser M. Kadah*

PRE-PRINTS

August 2023

43. Sparse and specific long-term plasticity emerge without homeostasis in a biophysically detailed cortical model
bioRxiv (Under review in eLife)
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

44. Community-based Reconstruction and Simulation of a Full-scale Model of Region CA1 of Rat Hippocampus
bioRxiv (Accepted for publication 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

45. 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

46. 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

47. 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

48. 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

49. 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

50. 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

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

Poster Abstracts

October 2024

52. Effective skeletonization of neuronal mesh models segmented from electron microscopy reconstructions
2014 Society for Neuroscience (SFN) Meeting · Chicago, USA
Authors — ***M. Abdellah** and Henry Markram*

July 2019

53. 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

54. 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

55. 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

56. *In silico* voltage sensitive dye imaging in a digital reconstruction of somatosensory cortex
2016 Society for Neuroscience (SFN) Meeting · San Diego, USA
Authors — *T. H. Newton, **M. Abdellah**, E. Muller, F. Schürmann, H. Markram*

October 2012

57. A Unifying Model of the Neocortical Column 15: High Performance Computing and Software Development Challenges
2012 Society for Neuroscience (SFN) Meeting, 268.A Unifying Model of the Neocortical Column · New Orleans, USA
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*

Technical Reports

February 2015

58. 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***

Theses

September 2017

59. *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

60. High Performance Fourier Volume Rendering on Graphics Processing Units (GPUs)
M.Sc. Thesis · Systems & Biomedical Engineering Department, School of Engineering, Cairo University · Cairo, Egypt
Authors — ***Marwan Abdellah***

July 2009

61. High Quality, High Performance, 3D Real-time Ultrasound Volume Reconstruction on Graphics Processing Units (GPUs)
B.Sc. Thesis · Systems & Biomedical Engineering Department, School of Engineering, Cairo University · Cairo, Egypt
Authors — ***Marwan Abdellah***, *Alaa Megawer, and Yasser Kaddah*

October 17, 2024