Marwan Abdellah *Résumé*

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.

Experience & Employment History

07.2011 – 12.2024	*Senior Visualization Research Engineer (Current) · Blue Brain Project · EPFL · Geneva · Switzerland*
01.2013 – 10.2013	*Software Engineer · Coursera EPFL · Lausanne · Switzerland*
03.2010 – 07.2010	*Software Engineer (Visualization) · Biomedical Group · Symbyo Technologies (360imaging) · Cairo · Egypt*
07.2009 – 07.2010	*Instructor (Visualization & HPC) · National Institute of Laser Advanced Sciences (NILES) · Cairo · Egypt*
09.2009 – 02.2010	*Biomedical Software Engineer · International Biomedical Engineering (IBE) Technologies · Cairo · Egypt*

Education

09.2012 — 09.2017	*Ph.D. In Silico Neuroscience · Blue Brain Project · EPFL · Lausanne · Switzerland*
09.2009 — 05.2012	*M.Sc. Biomedical Engineering · Biomedical Engineering Department · Cairo University · Cairo · Egypt*
09.2004 — 05.2009	*B.Sc. Biomedical Engineering · Biomedical Engineering Department · Cairo University · Cairo · Egypt*

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)*

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 · HDF5 · 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*

Proudly scripted with LaTeX · Updated October 17, 2024

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.

SELECTED PRESENTATIONS

October 2023
Leveraging Blender to model and visualize the neuro-glia-vascular (NGV) ensemble

MAJOR OPEN SOURCE CONTRIBUTIONS

2017 — Present
*Ultraliser**

2016 — Present
*NeuroMorphoVis** · *VessMorphoVis**

2015 — 2016
Livre

2011 — 2012
Equalizer

PERSONAL

Residence — *Lausanne · Switzerland*
HomePage — *www.marwan-abdellah.com*
Email — *abdellah.marwan@gmail.com*
Languages — English — *Fluent* · French — *Very Good (B2)* · Arabic — *Mothertongue*

PROFILE

Publications — *All the publications and scientific contributions are available online at marwan-abdellah.com/publications.html.*
Recommendations — *Recommendations are available upon request.*
Full profile — *A detailed curriculum vitæ is available at marwan-abdellah.com/about.html.*

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