John Paul Francis

Scientist, Developer, Producer

"Do not go where the path may lead, go instead where there is no path and leave a trail."

Education

2012–2016 **B.S. Computer Science, Business Administration, Cinematic Arts**, *Viterbi School of Engineering, University of Southern California*, Los Angeles.

2018–2021 **Ph.D. Computer Science**, *Michelson Center for Convergent Biosciences, University of Southern California*, Los Angeles, .

PhD thesis

title *Microscape: an Online 3D Rendering Platform for Data Communication, AI, and the Integrative Visualization of Biomedical Imaging*

supervisors Fei Sha, Raymond Stevens, Carl Kesselman, Mike Zyda

description Science, now as ever, is advanced by the creation, processing, and dissemination of information. In the biological sciences, modern tools combining image acquisition, deep learning, and online communication are still in their nascent stages. This thesis presents a developmental effort spanning multiple universities and imaging modalities, combining terabytes of imaging data in neural network pipelines to deliver amalgamate statistical visualizations of 3D structure that can be shared and viewed collaboratively.

Experience

Vocational

2019 **Joint Study Research Scientist**, *IBM Research*, San Jose, CA.

Summer appointment with shared funding between IBM and USC to segment organelle structures in single cell 3D X-ray Tomograms.
Detailed achievements:

- Applied neural networks to reduce an 8 hour annotation task to 8 minutes.
- Published work in the IEEE International Symposium on Biomedical Imaging 2020 titled "Neural Network Segmentation of Cell Ultrastructure Using Incomplete Annotation".
- Authored two patents for the combination of partial and full label sets in neural network training.

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2016–2018 **Contractor**, *Specular Theory*, Venice, CA.
Lead Developer, Director of Photography
Detailed achievements:
- Designed and developed software plugins for dynamic 360 video narratives.
- Managed developers and editors towards an interactive e-commerce experience that won best VR commercial/branded experience at VR Fest over 400 other nominees.
- Worked with diverse stakeholders including Google, Samsung, Accenture, and the United States Air Force.

2016–2018 **VR Film Producer**, *USA Today*, Various Locations.
Freelance filmmaker for VRtually There, a USA Today + Google experimental series.
Detailed achievements:
- Made quarterly pitches to executive producer, David Hamlin
- Carried out the end-to-end conception, production, post-production, and delivery of 6 short format episodes.
- Topics ranged from Olympic half-pipe skiing to highball rock climbing, the Standing Rock Native American protests, and National Park wildlife surveys.
- Each episode averaged 1.1 million views.
- Involved various locations, subcontractors, and talent around the world.

Skills

Science — Deep Learning, Data Cleansing, Image Processing, Computer Vision, Cell Chemistry, Biological Physics

Development — Python, Tensorflow, PyTorch, Unity3D/C, CSS, HTML, Javascript, Java, C++

Production — Adobe Suite, PTGui, Autopano, misc. Photography/Remote Camera Operation

Interests

Lacrosse — Head coach of Varsity Lacrosse Team at Beverly Hills High School, 2019-2020

Publications

[1] Valentina Loconte Jian-Hua Chen Axel Ekman Liping Sun Xianjun Zhang John Paul Francis Angdi Li Wen Lin Kaylee Tseng Gerry McDermott Frank Alber Andrej Sali Carolyn Larabell Raymond C. Stevens Kate L. White, Jitin Singla. Visualizing subcellular rearrangements in intact beta cells using soft x-ray tomography, Science Advances, 2020.

[2] John Paul Francis Tanveer Syeda-Mahmood Raymond C. Stevens Kate White, Hongzhi Wang. Neural network segmentation of cell ultrastructure using incomplete annotation, IEEE ISBI, 2020.

[3] Francesco Cutrale Scott Fraser-Raymond Stevens Kyle McClary, John Paul Francis. Microscape: Visualize 3d+ imaging data in virtual reality and on desktop, mobile, and web using game engine technology., In Preparation.

Intellectual Property

Model Training Using Fully and Partially Annotated Images - P201909931US01 (9216-US01)

Model Training Using Partially-Annotated Images - P201909931AUS01 (9216-US02)

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