Geoffrey F. Schau

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RESEARCH INTERESTS

My current research interests concern the application of deep learning methods that integrate imaging and genomics data, particularly at single-cell resolution, in the context of cancer biology.

FORMAL EDUCATION

Oregon Health & Science University — 2020 (*expected)*
Doctor of Philosophy in Biomedical Engineering — *Portland, Oregon, USA*

Portland State University — 2015
Master of Science in Electrical Engineering — *Portland, Oregon, USA*

Rose-Hulman Institute of Technology — 2012
Bachelor of Science in Biomedical Engineering — *Terre Haute, Indiana, USA*

PROFESSIONAL EXPERIENCE

Oregon Health & Science University — 2015-present
PhD Candidate — *Portland, Oregon, USA*

BrighterBioDesigns — 2019-present
Sole Proprietor — *Portland, Oregon, USA*

Microsystems Engineering, Inc. — 2012-2015
Applied Research Engineer — *Lake Oswego, Oregon, USA*

RH Ventures, Inc. — 2011-2012
Biomedical Engineering Intern — *Terre Haute, Indiana, USA*

Boston Scientific, Inc. — Summer, 2011
Manufacturing Engineering Intern — *Arden Hills, Minnesota, USA*

PUBLICATIONS AND PREPRINTS

- **Schau, G.F.**, "Estimating Shared Information Content through Unsupervised Imaging-Omics Domain Translation at Single-Cell Resolution" (*in preparation*)
- **Schau, G.F.**, "Levering Histological Feature Dissimilarity between Primary and Metastatic Cancers for the Prediction of Metastatic Origin" (*in preparation*)
- **Schau, G.F.**, Burlingame, E.A., Thibault, G., Anekpuritanang, T., Wang, Y., Gray, J.W., Corless, C., Chang, Y.H., "Predicting Primary Site of Secondary Liver Cancer with a Neural Estimator of Metastatic Origin (NEMO)", *BioRxiv*, 2019 (*under review*)
- Burlingame, E.A., McDonnell, M., **Schau, G.F.**, Thibault, G., Lanciault, C., Morgan, T., Corless, C., Gray, J.W., Johnson, B., Chang, Y.H., "SHIFT: virtual immunofluorescence staining of histologically-stained tissue by deep learning" (*under review*)
- Thibault, G., Riesterer, J., Stoltz, K., Loftis, K., **Schau, G.F.**, Stempinksi, E., Lopez, C., Chang, Y.H., Gray, J.W., "Computer Vision Techniques for Cancerous Cell Analysis in FIB-SEM Images", *Proceedings of Microscopy and Microanalytics*, Vol. 25, 2019
- **Schau, G.F.**, Dane, M., Thibault, G., Gray J.W., Heiser, L., Chang, Y.H., "Variational Autoencoding Tissue Response to Microenvironment Perturbation", *Proc. SPIE Medical Imaging*, Vol. 10949, 2019

- **Schau, G.F.**, "Device, Method, and Algorithm to Assess Changes in Cardiac Output via Intracardiac Impedance Monitoring" Master's Thesis, Portland State University, Portland, OR, USA, 2015.

ORAL PRESENTATIONS

- Estimating Mutual Information Content of Biomedical Data Modalities through Self-Supervised Domain Translation, *NeurIPS Workshop: Learning Meaningful Representations of Life*, Vancouver, Canada, 2019
- Deep Neural Estimation of Metastatic Origin of Liver Cancer, *Frontiers of AI-Assisted Care Scientific Symposium (FAC)*, Stanford University, Palo Alto, CA, USA, 2019
- Predicting Primary Site of Secondary Liver Cancer with a Neural Estimator of Metastatic Origin (NEMO) *PacNow Quantitative Biology Symposium*, OHSU, Portland, OR, USA, 2019
- SHIFT.AI: Accelerated Imaging Analytics, *InventOR Pitch Competition*, Portland, OR, USA, 2019
- Deep Learning for Biomedical Domain Translation, *BME Seminar*, OHSU, Portland, OR, USA, 2019
- (*Invited Speaker*) Seeing More: Deep Learning in Biomedicine *BME Retreat*, Portland, OR, USA, 2019
- Variational Autoencoding Tissue Response to Microenvironment Perturbation, *SPIE Medical Imaging*, San Diego, CA, USA 2019

POSTER PRESENTATIONS

- Histological Feature Dissimilarity between Primary and Metastatic Cancer, *IMO Workshop V9.0 Tumor Board Evolution*, Moffitt Cancer Center, Tampa, FL, USA, 2019
- Estimating Mutual Information Content of Biomedical Data Modalities through Self-Supervised Domain Translation, *NeurIPS Workshop: Learning Meaningful Representations of Life*, Vancouver, Canada, 2019
- Neural Estimation of Metastatic Origin, *NCI Mathematical Oncology/CSBC-PSON West Coast Symposia*, OHSU, Portland, OR, USA, 2019
- Deep Learning Approach for Assessment of Microenvironment Signals on Phenotypic State of Triple Negative Breast Cancer, *International Association of Breast Cancer Research*, Egmond An Zee, The Netherlands, 2019
- Principle Feature Manifolds of Multicellular Growth Response to Microenvironment Perturbation, *OHSU Research Week*, Portland, OR, USA, 2018
- SHIFT: Predicting Biomarker Distribution in Medical Images through Speedy Histopathological to Immunofluorescent Translation, *OHSU Commercialization Conference*, OHSU, Portland, OR, USA, 2018
- Developmental Discordance Analysis for Single-Cell RNA-seq, *Intelligent Systems for Molecular Biology*, Prague, Czech Republic, 2017
- Consensus Representation of Lineage Expression (CREoLE) for Single-Cell RNA-seq, *Intelligent Systems for Molecular Biology*, Orlando, FL, USA, 2016

SELECTED AWARDS

Integrated Mathematical Oncology Workshop on Tumor Board Evolution (Travel Award)	2019
NeurIPS Workshop: Learning Meaningful Representations of Life (Travel Award)	2019
CSBC-PSON West Coast Symposium Junioer Investigator (Team Award, $36,600)	2019
InventOR Impact Award ($5,000)	2019
OHSU Center for Spatial Systems Biomedicine to IABCR (Travel Award)	2019
OCTRI Biomedical Innovation Program Funding Award (Team Award, $40,000)	2018
AMIA National Student Design Competition (Team Award, 3rd place)	2016
National Library of Medicine Pre-Doctoral Fellowship	2015

TEACHING, MENTORING, AND SERVICE

Program Committee	Machine Learning in Computational Biology (MLCB)	2019
Team Lead	Simulation Team, CSBC Junior Investigator Project	2019
Lecturer	"Neural Networks in a Nutshell", OCSSB Lecture Series, *OHSU*	2019
Lecturer	"Deep Learning in Biomedicine", CDCB Lecture Series, *OHSU*	2018-2019
Judge	Intel Northwest Science Expo	2016-2018
Teaching Assistant	ECE 203: Analog Circuit Analysis, *Portland State University*	2015
Teaching Assistant	ECE 102: Engineering Programming, *Portland State University*	2015
Judge	FIRST Robotics Design Competition	2014-2017

INTELLECTUAL PROPERTY

Title	**Application Number**	**Filing Date**
Translation of Images of Stained Biological Material	62/787,088	December 31, 2018
Translation of Images of Stained Biological Material	62/885,777	August 12, 2019

SKILLS AND INTERESTS

Computational: Python, R, MATLAB, bash, slurm, condor, Unity (VR), LaTeX
Engineering: Analog circuitry, machining, soldering, CAD, 3D printing
Interests: Skiing, mountaineering, cooking, board games, oil painting, rock climbing

REFERENCES

Young Hwan Chang, PhD chanyo@ohsu.edu
PhD Mentor *Oregon Health & Science University*

Joe W. Gray, PhD grayjo@ohsu.edu
PhD Committee Member *Oregon Health & Science University*

Laura M. Heiser, PhD heiser@ohsu.edu
PhD Committee Chair *Oregon Health & Science University*