Kevin A. Yamauchi, Ph.D.

Postdoctoral Fellow
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Research interests: To advance our understanding of how the architecture of biological systems impacts their function, I engineer analysis methods and bioinstrumentation to quantify morphology and organization across all biologically-relevant length scales. In collaboration with biologists and theoreticians, I apply these methods to study the physical and chemical mechanisms that shape our cells, tissues, and organs.

Education

Ph.D. Bioengineering, University of California, Berkeley, 2017
- Dissertation: "Microfluidic tools for high throughput, multiparameter analysis of single cells"
- Advisor: Prof. Amy E. Herr

M.S. Mechanical Engineering, California Polytechnic State University, San Luis Obispo, 2012
- Thesis: "Prediction of Articular Cartilage Remodeling During Dynamic Compression with a Finite Element Model"
- Advisor: Prof. Stephen Klisch

B.S. Mechanical Engineering, California Polytechnic State University, San Luis Obispo, 2012

Work History

- Postdoctoral Researcher, ETH Zürich, 2021-Present
- Steering Council & Core Developer, napari, 2018-Present
- Postdoctoral Researcher, Friedrich Miescher Institute for Biomedical Research, 2020
- Senior R&D Engineer, Chan Zuckerberg Biohub: 2017-2020
- Graduate Student Researcher, UC Berkeley, 2012-2017
- Microfluidics intern, 10X Genomics, 2016

Awarded Research Funding

Chan Zuckerberg Initiative Single Cell Data Insights (2023-2024)
Role: Co-PI, Amount: $398,976

Chan Zuckerberg Initiative Seeding napari Sustainability Grant (2022-2023)
Role: PI, Amount: $199,916

PHRT Transition Postdoc Fellowship (2021-2023)
Role: PI, Amount: 236,795 CHF

ETH Open Research Data Contribute grant (2022-2023)
Role: PI, Amount: 30,000 CHF

NSF Graduate Research Fellowship (2011-2016)
Role: Fellow, Amount: $121,500

Publications

Preprints/in review (2 first author, 2 co-author)

[4] L Lamm , S Zufferey , RD Righetto , W Wietrzynski , **KA Yamauchi** , A Burt, Y Liu , H Zhang , A Martinez-Sanchez , S Ziegler , F Isensee , JA Schnabel, BD Engel, Tingying Peng. MemBrain v2: an end-to-end tool for the analysis of membranes in cryo-electron tomography. *bioRxiv*, 2024.

[3] **KA Yamauchi***, A Burt*. napari-threedee: a toolkit for human-in-the-loop 3D image analysis. *bioRxiv, 2023.* *=**co-first authors**

[2] FL Lampart, R Vetter, Y Wang, F Meer, **KA Yamauchi**, N Strohmeyer, M-D Hussherr, G Camenisch, C Rentsch, D Müller, C Le Magnen, L Bubendorf, D Iber. Morphometric analysis of epithelial bladder cancer onset. *bioRxiv*, 2023

[1] **KA Yamauchi***, M Biniasch*, L Franz*, H Gomez, C de Geyter, D Iber. FollicleFinder: automated three-dimensional segmentation of human ovarian follicles, *bioRxiv*, 2022 . ***=co-first authors**

Peer reviewed (4 first author, 15 co-author)

[19] L Marconato*, G Palla*, **KA Yamauchi***, I Virshup*, E Heidari, T Treis, I Kats, M Toth, R Shrestha, W Huber, M Gerstung, J Moore, FJ Theis, O Stegle. SpatialData: an open and interoperable data framework for spatial omics. *Nature Methods*, 2024 *=**co-first authors**

[18] J Moore, D Basurto-Lozada, S Besson, J Bogovic, J Bragantini, EM Brown, JM Burel, G de Medeiros, EE Diel, D Gault, SS Ghosh, I Gold, YO Halchenko, M Hartley, D Horsfall, MS Keller, MS Kittisopikul, G Kovacs, AK Yoldaş, A le Tournoulx de la Villegeorges, T Li, P Liberali, M Linkert, D Lindner, J Lüthi, J Maitin-Shepard, T Manz, M McCormick, K Mohamed, W Moore, B Özdemir, C Pape, L Pelkmans, M Prete, T Pietzsch, Stephan Preibisch, N Rzepka, DR. Stirling, J Striebel, C Tischer, D Toloudis, P Walczysko, AM Watson, F Wong, **KA Yamauchi,** O Bayraktar, M Haniffa, S Saalfeld, JR Swedlow. OME-Zarr: a cloud-optimized bioimaging file format with international community support, *Histochemistry and Cell Biology*, 2023

[17] R Pálovics, A Keller, N Schaum, W Tan, T Fehlmann, M Borja, F Kern, L Bonanno, K Calcuttawala, JT Webber, A McGeever, The Tabula Muris Consortium, J Luo, A Oliveira Pisco, J Karkanias, NF Neff, S Darmanis, SR Quake, T Wyss-Coray. Molecular hallmarks of heterochronic parabiosis at single-cell resolution. *Nature*, 2022

[16] J Vo-Phamhi, **KA Yamauchi**, R Gomez-Sjöberg. Validation and tuning of in situ transcriptomics image processing workflows with crowdsourced annotations, *PLoS Comp. Bio.*, 2021.

[15] J Vlassakis, **KA Yamauchi**, AE Herr. Summit: Automated Analysis of Arrayed Single-Cell Gel Electrophoresis. *SLAS Technology*, 2021.

[14] S Axelrod, M Cai, AJ Carr, J Freeman, D Ganguli, JT Kiggins, B Long, T Tung, **KA Yamauchi**. starfish: scalable pipelines for image-based transcriptomics. *Journal of Open Source Software*, 2021.

[13] CR Zamecnik*, JV Rajan*, **KA Yamauchi**, SA Mann, RP Loudermilk, GM Sowa, KC Zorn, BD Alvarenga, C Gaebler, M Caskey, M Stone, PJ Norris, W Gu, CY Chiu, D Ng, JR Byrnes, XX Zhou, JA Wells, MR Wilson. ReScan, a multiplex diagnostic pipeline, pans human sera for SARS-CoV-2 antigens, *Cell Reports Medicine*, 2020, * = contributed equally

[12] N Schaum, B Lehallier, O Hahn, R Pálovics, S Hosseinzadeh, SE Lee, R Sit, DP Lee, P Morán Losada, ME Zardeneta, T Fehlmann, JT Webber, A McGeever, K Calcuttawala, H Zhang, D Berdnik, V Mathur, W Tan, A Zee, M Tan, The Tabula Muris Consortium*, A Oliveira Pisco, J Karkanias, NF Neff, A Keller, S Darmanis, SR Quake, T Wyss-Coray. Ageing hallmarks exhibit organ-specific temporal signatures, *Nature,* 2022

[11] A Maynard*, CE McCoach*, JK. Rotow, L Harris, F Haderk, DL Kerr, EA.Yu, EL Schenk, W Tan, A Zee, M Tan, P Gui, T Lea, W Wu, A Urisman, K Jones, R Sit, PK Kolli, E Seeley Y Gesthalter, DD Le, **KA Yamauchi**, DM Naeger, S Bandyopadhyay, K Shah, L Cech, NJ Thomas, A Gupta, M Gonzalez, H Do, L Tan, B Bacaltos, R Gomez-Sjoberg, M Gubens, T Jahan, JR Kratz, D Jablons, N Neff, RC.Doebele, J Weissman, CM Blakely, S Darmanis, TG.Bivona, Therapy-Induced Evolution of Human Lung Cancer Revealed by Single-Cell RNA Sequencing, *Cell*, 2020

[10] S Jaewoody, **KA Yamauchi**, AE Herr. Laterally Aggregated Polyacrylamide Gels for Immunoprobed Isoelectric Focusing. *Analytical Chemistry*, 2020

[9] The Tabula Muris Consortium. A single-cell transcriptomic atlas characterizes ageing tissues in the mouse, *Nature*, 2020

[8] Q Pan, **KA Yamauchi**, AE Herr. Controlling Dispersion during Single-Cell Polyacrylamide-Gel Electrophoresis in Open Microfluidic Devices, *Analytical Chemistry*, 2018

[7] **KA Yamauchi***, AM Tentori*, AE Herr. Arrayed isoelectric focusing using photopatterned multi-domain hydrogels, *Electrophoresis*, 2018, * = **co-first authors**

[6] **KA Yamauchi,** AE Herr. Subcellular western blotting of single cells. *Microsystems and Nanoengineering*, 2017

[5] E Sinkala, E Sollier-Christen, C Renier, E Rosas-Canyelles, J Che, K Heirich, TA Duncombe, J Vlassakis, **KA Yamauchi**, H Huang, S Jeffrey, AE Herr, Profiling protein expression in circulating tumor cells using microfluidic western blotting. *Nature Communications*, 2017.

[4] P Abdel-Sayed, **KA Yamauchi**, R Gerver, AE Herr. Fabrication of an open microfluidic device for immunoblotting. *Analytical Chemistry*, 2017.

[3] AM Tentori*, **KA Yamauchi***, AE Herr. Detection of isoforms differing by a single charge unit in individual cells. *Angewandte Chemie*, 2016. * = **co-first authors**

[2] CC Kang, **KA Yamauchi***, J Vlassakis*, E Sinkala, TA Duncombe. Single cell–resolution western blotting. *Nature Protocols*, 2016. *** = equal contribution**

[1] ME. Stender, CB Raub, **KA Yamauchi**, R Shirazi, P Vena, RL Sah, SJ. Hazelwood, & SM Klisch. Integrating qPLM and biomechanical test data with an anisotropic fiber distribution model and predictions of TGF-β1 and IGF-1 regulation of articular cartilage fiber modulus. *Biomechanics and Modeling in Mechanobiology*, 2013.

Selected Research Talks

- “Towards a multiscale framework for studying tissue architecture”. Roche Institute of Human Biology, Switzerland (2024)
- “Towards a multiscale framework for studying tissue architecture”. Paul Scherrer Institute, Switzerland (2023)
- “SpatialData: an open and universal data framework for multi-modal spatial omics” OME-NGFF Hackathon, Switzerland (2023)
- “SpatialData: an open and universal data framework for multi-modal spatial omics” Spatial Omics Basel, Switzerland (2023)
- “napari-threedee: a toolkit for human-in-the-loop 3D image analysis”, From Images to Knowledge, virtual (2022)
- “Follicle Finder: automated three-dimensional segmentation of human ovarian follicles”, SIB Days, Switzerland (2022)
- “napari: n-dimensional data viewer in python” Chan Zuckerberg Initiative Neurodegeneration Challenge Network, virtual (2021)
- “In Situ Toolkit: a platform for automating in situ transcriptomics” Chan Zuckerberg Biohub, USA (2019)
- “Isoelectric focusing resolves protein isoforms differing by a single-charge unit with single-cell resolution” International Symposium on High Performance Liquid PhaseSeparations and Related Technique, USA (2016)
- “Isoform Cytometry: Isoelectric focusing resolves protein isoforms differing by a single-charge unit with single-cell resolution.” microTAS, Ireland (2016)
- “Sub-cellular Western Blotting of Single Cells”, microTAS, USA (2014)

Patents

[3] Isoelectric focusing arrays and methods of use thereof. *US Patent 10,768,141*. 2020.

[2] Subcellular western blotting of single cells. *US Patent 10,408,842*. 2019.

[1] Electrophoretic Separation Devices and Methods for Using the Same. *US Patent 20,150,316,547*. 2015

Supervision of Junior Researchers

PhD Students (secondary supervisor)

- Gilles Gut (2022-Present)
- Daniel Schirmacher (2022-Present)
- Leopold Franz (2021-Present)

M.S. Students

- Federico Carrara (2023)
- Maoxia Li (2022-2023)
- Ketan Gupta (2022)
- Yihao Liu (2022)
- Dimitri Spicher (2021-2022)
- Ting-Yu Ho (2020)
- Oliver Lin (2017)
- Tara Armand (2017)

B.S. Students

- Jenny Vo-Phamhi (2019-2021)
- Joana Cabrera (2015, 2019-2020)
- Linnar Linnarson (2019)
- Liyin Chen (2016)
- Kevin Jiang: (2016)
- Erika Cruz (2015)

Teaching Activities

Instructor, invited workshops on image processing and open source software development

- EPFL (2023)
- Institut Pasteur (2023)
- EMBL Heidelberg (2023)
- Zurich Life Science Graduate School Retreat (2022)
- Chan Zuckerberg Initiative Neurodegeneration Challenge Network (2021)
- Scipy conference (2022)
- napari plugin development hackathon (2022)
- EMBO practical course: “Advanced Methods in Bioimage Analysis” (2021)
- Switzerland's Image and Data Analysis School (2021)
- Image2Knowledge conference (2020)

Invited Lecturer

- “Image processing with napari”, University of Zurich (2023)
- “Spatio-temporal Modeling in Biology” course, ETH Zurich (2021, 2022)

Course Developer & Teaching Assistant, UCSF Fab@Lab course (2019)

- Co-developed a three week intensive lab course teaching biology PhD students how to design, build, and test an automated luminometer.
- Course evaluation: 4.8/5.0 (university and department averages are 4.3)

Course Developer & Teaching Assistant, Cold Spring Harbor Laboratory Single Cell Analysis course (2015, 2016)

- Developed a hands-on course module to teach the theory and practice of the single-cell western blotting assay.
- Consulted with students on ways to integrate single-cell western blotting into their research.

Graduate Student Instructor, UC Berkeley BioE Senior Capstone Design (2014)

- Taught the engineering design method to a class of 30 bioengineering undergraduates.
- Developed and taught a workshop on rapid prototyping of mechatronics with Arduino.

Active memberships in scientific societies

Founding Member, *Swiss Bioimage Analysis Society* (2021-Present)

The Swiss Bioimage Analysis Society is a network of bioimage analysts in Switzerland that provides training, shares best practices, and discusses state of the art methods.

Steering Council Member, Core Developer, *napari*: https://github.com/napari/napari (2018-Present)

napari is a widely used (> 3 million downloads) python-based, GPU-accelerated n-dimensional image viewer for annotating images and accelerating image processing via integration with modern deep learning algorithms and big data tools. As a Steering Council member, I co-lead the project, establish the long term vision, and raise funding for continued development.

Awards

- Siebel Scholars Fellowship: 2017
- Lloyd Graduate Fellowship: 2016
- UC Berkeley Outstanding Graduate Student Instructor: 2014
- Chemical and Biological Microsystems Society Young Researcher Grant: 2014
- California Polytechnic State University, San Luis Obispo Outstanding Graduate Student: 2012