

Christopher E. Arcadia

Curriculum Vitae

Education

- 2015–2020 **Ph.D. in Electrical and Computer Engineering**
Brown University, Providence, RI, USA.
- 2013–2015 **M.Sc. in Electrical and Computer Engineering**
Brown University, Providence, RI, USA.
- 2009–2013 **B.Sc. in Electrical Engineering**
Columbia University, New York, NY, USA.

Experience

- 2021–Now **Scientist II, Machine Learning**
Alltrna, Computational Molecular Biology Team.
 - ML-guided design of tRNA-based therapeutics
- 2021–2021 **Project Engineer**
Triton Systems, Disruptive Technology and Materials Design Group.
 - designed integrated sensors for an organ-on-a-chip platform
 - developed chemical detectors based on field-effect transistors
 - made an impedance analyzer for monitoring bio-activity
 - wrote grant proposals to address government solicitations
- 2020–2021 **Postdoctoral Research Associate**
Brown University, Rosenstein Laboratory for Embedded Bioelectronics.
 - developed a lab-on-a-chip cell culture platform
 - explored the use of autocatalytic reactions for alternative computing
 - developed an analysis pipeline for time-ordered reactions
 - designed control hardware for an open-source ventilator
- 2013–2020 **Graduate Research Assistant**
Brown University, Rosenstein Laboratory for Embedded Bioelectronics.
 - synthesized large libraries of drug-like compounds
 - developed high throughput screening techniques based on mass spectrometry
 - stored over a megabit of data in chemical mixtures

- o developed an automated platform for making and using nanopore sensors
- o performed single-molecule studies with solid-state nanopores
- o designed a wide bandwidth, low noise current amplifier

2011–2013 **Undergraduate Research Assistant**

Columbia University, Shepard Group for Bioelectronic Systems.

- o learned a variety of semiconductor fabrication techniques
- o evaluated graphene as an interconnect diffusion barrier
- o developed a microfluidic flow cytometer
- o built a rapid thermal annealing system

Teaching

2016–2018 **Graduate Teaching Assistant**

Spring Electrical Circuits & Systems (ENGN0520), Brown University.

- o lectured sections and held office hours
- o designed and proctored labs

Skills

Topics

machine learning, signal processing, data analysis, circuit design, multiphysics simulation, sensor fabrication, lab automation, high-throughput screening.

Programming Languages

Python, C, Java, MATLAB, LabVIEW.

Data Science

numpy, scipy, scikit, pandas, TensorFlow, PyTorch, RDkit.

Circuit Design

Altium, KiCad, PADS, EAGLE, MPLAB, Arduino, Cadence.

Simulation

COMSOL, Mathematica, LTspice.

Analytical Chemistry

mass spectrometry, liquid chromatography, fluid handling, microplate readers.

Documentation

Adobe CC, Microsoft Office, LaTeX, Git, Jupyter.

Publications

- 2021 Arcadia, C. E., Dombroski, A., Oakley, K., Chen, S. L., Tann, H., Rose, C., Kim, E., Reda, S., Rubenstein, B. M., & Rosenstein, J. K. (2021). **Leveraging auto-**

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catalytic reactions for chemical domain image classification. *Chemical Science*. <https://doi.org/10.1039/d0sc05860b>

Arcadia, C. E., Hu, K., Epstein, S., Wanunu, M., Adler, A., & Rosenstein, J. K. (2021). **CMOS electrochemical imaging arrays for the detection and classification of microorganisms.** *IEEE International Symposium on Circuits and Systems*, 1–5. <https://doi.org/10.1109/iscas51556.2021.9401471>

Dombroski, A., Oakley, K., Arcadia, C., Nouraei, F., Chen, S. L., Rose, C., Rubenstein, B., Rosenstein, J., Reda, S., & Kim, E. (2021). **Implementing parallel arithmetic via acetylation and its application to chemical image processing.** *Proceedings of the Royal Society A*, 477(2248), 20200899. <https://doi.org/10.1098/rspa.2020.0899>

Hu, K., Arcadia, C. E., & Rosenstein, J. K. (2021). **A Large-Scale Multimodal CMOS Biosensor Array with 131,072 Pixels and Code Division Multiplexed Readout.** *IEEE Solid-State Circuits Letters*, PP(99), 1–1. <https://doi.org/10.1109/lssc.2021.3056515>

Kennedy, E., Geiser, J., Arcadia, C. E., Weber, P. M., Rose, C., Rubenstein, B. M., & Rosenstein, J. K. (2021). **Secret messaging with endogenous chemistry.** *Scientific Reports*, 11(1), 13960. <https://doi.org/10.1038/s41598-021-92987-2>

2020 Arcadia, C. E., Kennedy, E., Geiser, J., Dombroski, A., Oakley, K., Chen, S.-L., Sprague, L., Ozmen, M., Sello, J., Weber, P. M., Reda, S., Rose, C., Kim, E., Rubenstein, B. M., & Rosenstein, J. K. (2020). **Multicomponent molecular memory.** *Nature Communications*, 11(1), 691. <https://doi.org/10.1038/s41467-020-14455-1>

Rosenstein, J. K., Rose, C., Reda, S., Weber, P. M., Kim, E., Sello, J., Geiser, J., Kennedy, E., Arcadia, C., Dombroski, A., Oakley, K., Chen, S. L., Tann, H., & Rubenstein, B. M. (2020). **Principles of Information Storage in Small-Molecule Mixtures.** *IEEE Transactions on NanoBioscience*, 1–1. <https://doi.org/10.1109/tnb.2020.2977304>

2019 Kennedy, E., Arcadia, C. E., Geiser, J., Weber, P. M., Rose, C., Rubenstein, B. M., & Rosenstein, J. K. (2019). **Encoding information in synthetic metabolomes.** *PLOS ONE*, 14(7), e0217364. <https://doi.org/10.1371/journal.pone.0217364>

- 2018 Arcadia, C. E., Perera, R. T., & Rosenstein, J. K. (2018). **High throughput Characterization of Dielectric Breakdown Nanopore Sensors in a Meniscus Contact Platform.** *Biophysical Journal*, 114(3), 181a. <https://doi.org/10.1016/j.bpj.2017.11.1009>
- Arcadia, C. E., Tann, H., Dombroski, A., Ferguson, K., Chen, S. L., Kim, E., Rose, C., Rubenstein, B. M., Reda, S., & Rosenstein, J. K. (2018). **Parallelized Linear Classification with Volumetric Chemical Perceptrons.** *IEEE International Conference on Rebooting Computing*, 00, 1–9. <https://doi.org/10.1109/icrc.2018.8638627>
- Perera, R. T., Arcadia, C. E., & Rosenstein, J. K. (2018). **Probing the nucleation, growth, and evolution of hydrogen nanobubbles at single catalytic sites.** *Electrochimica Acta*, 283(Langmuir 32 2016), 1773–1778. <https://doi.org/10.1016/j.electacta.2018.07.063>
- Qiu, Y., Arcadia, C., Alibakhshi, M. A., Rosenstein, J., & Wanunu, M. (2018). **Nanopore Fabrication in Ultrathin HFO 2 Membranes for Nanopore-Based DNA Sequencing.** *Biophysical Journal*, 114(3), 179a. <https://doi.org/10.1016/j.bpj.2017.11.999>
- 2017 Arcadia, C. E., Perera, R. T., & Rosenstein, J. K. (2017). **In situ Nanopore Sensing With a Scanning Probe Platform.** *Biophysical Journal*. <http://pubs.acs.org/doi/abs/10.1021/acsnano.7b01519>
- Arcadia, C. E., Reyes, C. C., & Rosenstein, J. K. (2017). **In Situ Nanopore Fabrication and Single-Molecule Sensing with Microscale Liquid Contacts.** *ACS Nano*, 11(5), 4907–4915. <https://doi.org/10.1021/acsnano.7b01519>
- 2015 Arcadia, C., & Rosenstein, J. K. (2015). **Improved Protocols for Dielectric Breakdown Nanopore Biosensors.** *Biophysical Journal*, 108. <https://doi.org/10.1016/j.bpj.2014.11.962>