Alison M. Thompson, Ph.D.

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SUMMARY

I am an analytical chemist and research scientist interested in using statistics and data science to drive decision-making. My scientific expertise includes microscopy, microfluidics, single-cell imaging, digital PCR, and development of single-cell genetic assays.

EDUCATION

Ph.D., Chemistry, University of Washington March 2017
Dissertation: *Single-Cell Molecular Profiling of Nucleic Acids in the Microfluidic Self-Digitization Chip*
Advisor: Daniel T. Chiu

B.S., Chemistry, minor in Molecular Biology, Miami University May 2009
Honors Thesis: *Identification of a Biologically Active Component from* Aloe arborescens
Advisor: Richard L. Bretz

RESEARCH EXPERIENCE

Postdoctoral Research Fellow 2017–present
Fred Hutchinson Cancer Research Center Seattle, WA
Advisor: Jerald P. Radich

I am developing a single-cell genotyping device to assess intra-patient genetic heterogeneity in cancer. The device uses microfluidic technology to partition single cells and assay reagents into nanoliter volume reactors. I developed scripts for statistical analysis of the resulting images in ImageJ and R, and performed data visualization and calculated summary statistics in R. A first-author publication describing this project is currently under peer-review.

Graduate Research Assistant 2009–2017
Department of Chemistry, University of Washington Seattle, WA
Advisor: Daniel T. Chiu

I carried out multiple projects to use microfluidic methods for DNA and RNA analysis, including development of devices for disease assessment in low-resource laboratory settings and measurement of individual mRNA molecules in single-cells. I also mentored and supervised four undergraduate students for their honors thesis projects.

NSF REU Undergraduate Research Assistant Summer 2008
Department of Chemistry, Colorado State University Fort Collins, CO
Advisor: Charles S. Henry

For this summer internship, I developed a low-cost microfluidic capillary electrophoresis device to characterize complex mixtures of neurotransmitters, aiming to create new methods to monitor Parkinson's disease.

Undergraduate Research Assistant 2007–2009
Department of Chemistry, Miami University Oxford, OH
Advisor: Richard L. Bretz

I initiated a project to identify a biologically active small molecule after collaborator observed fungal growth-inhibition from the gel extract of an aloe species. I performed fractionation by HPLC and used NMR spectroscopy and mass spectrometry to identify the active species.

HONORS & AWARDS

Nanotechnology Early Bird Award, University of Washington, Autumn 2009
Mindlin Excellence in Chemistry Graduate Fellowship, University of Washington, 2009
Departmental Honors in Chemistry, Miami University, Spring 2009
cum laude, Miami University, Spring 2009
National Science Foundation Research Experience for Undergraduates Award, Colorado State University, Summer 2008
Undergraduate Summer Scholars Program, Miami University, Summer 2007
Scholar's Program, Miami University, 2005-09

PUBLICATIONS

5. Kuo, C-T.; Thompson, A. M.; Gallina, M. E.; Ye, F.; Johnson, E. S.; Sun, W.; Zhao, M.; Yu, J.; Wu, I-C.; Fujimoto, B.; DuFort, C. C.; Carlson, M. A.; Hingorani, S. R.; Paguirigan, A. L.; Radich, J. P.; Chiu, D. T. Optical painting and fluorescence activated sorting of single adherent cells labelled with photoswitchable Pdots. *Nat. Commun.* **2016**, *7*, 11468. 10.1038/ncomms11468

4. Thompson, A. M.; Gansen, A.; Paguirigan, A. L.; Kreutz, J. E.; Radich, J. P.; Chiu, D. T. Self-Digitization Microfluidic Chip for Absolute Quantification of mRNA in Single Cells. *Anal. Chem.* **2014**, *86* (24), 12308–12314. 10.1021/ac5035924

3. Thompson, A. M.; Paguirigan, A. L.; Kreutz, J. E.; Radich, J. P.; Chiu, D. T. Microfluidics for Single-Cell Genetic Analysis. *Lab Chip* **2014**, *14* (17), 3135–3142. 10.1039/C4LC00175C

2. Schneider, T.; Yen, G. S.; Thompson, A. M.; Burnham, D. R.; Chiu, D. T. Self-Digitization of Samples into a High-Density Microfluidic Bottom-Well Array. *Anal. Chem.* **2013**, *85* (21), 10417–10423. 10.1021/ac402383n

1. Gansen, A.; Herrick, A. M.; Dimov, I. K.; Lee, L. P.; Chiu, D. T. Digital LAMP in a Sample Self-Digitization (SD) Chip. *Lab Chip* **2012**, *12* (12), 2247–2254. 10.1039/C2LC21247A

PRESENTATIONS

5. "Self-Digitization Microfluidic Chip for Absolute Quantification of mRNA in Single Cells." Poster Presentation, Puget Sound Women Chemists Retreat, Eatonville, WA, May 2015.

4. "Sequence-specific detection of mRNA in a digital PCR microfluidic device." Poster Presentation, Puget Sound Women Chemists Retreat, Vancouver, BC, Canada, May 2014.

3. "Genetic analysis performed on a digital PCR microfluidic device." Poster Presentation, Puget Sound Women Chemists Retreat, Eatonville, WA, May 2013.

2. "Surface Plasmon Resonance for the Detection of Nucleic Acids." Analytical Seminar Series, University of Washington, Department of Chemistry, Seattle, WA, March 2011.

1. "Identification of a Biologically Active Compound from *Aloe arborescens*." Poster Presentation, 237th National Meeting of the American Chemical Society, Salt Lake City, UT, March 2009.

TEACHING EXPERIENCE

Lead Teaching Assistant Winter 2016
Department of Chemistry, University of Washington
- Supervised 10 teaching assistants for a class of 500 students.
- Facilitated recitation and laboratory sections for 24 students.
- Held weekly office hours and graded reports and exams.
- Managed the course website and grade reporting.

Teaching Assistant (6 quarters) 2010–2015
Department of Chemistry, University of Washington
- Facilitated weekly recitation and laboratory sessions for 24-48 introductory general chemistry students per quarter.
- Held weekly office hours and graded reports and exams.

Supplemental Instruction Leader (4 semesters) 2006–2009
Department of Chemistry, Miami University
- Facilitated weekly recitation sessions for general and organic chemistry students.

PROFESSIONAL MEMBERSHIPS AND COMMUNITY SERVICE

American Medical Writers Association, member, 2017 – present
Puget Sound Women Chemists Retreat, co-founder, webmaster, and committee member, 2014 & 2016
Pacific Science Center Life Science Discovery Week, annual presenter, 2013-2015
American Chemical Society Puget Sound Section, Younger Chemists Committee Chair, 2012-2014