

Elain S. Fu
Professor
School of Chemical, Biological, and Environmental Engineering
Oregon State University

Professional Experience

2024–present	Professor School of Chemical, Biological, and Environmental Engineering Oregon State University
2023–present	Director of the Bioengineering graduate program Oregon State University
2019–2024	Associate Professor School of Chemical, Biological, and Environmental Engineering Oregon State University
2015–2019	Assistant Professor School of Chemical, Biological, and Environmental Engineering Oregon State University
2013–2015	Assistant Professor (Sr. Research) School of Chemical, Biological, and Environmental Engineering Oregon State University
2010–2013	Research Assistant Professor Department of Bioengineering University of Washington

Instructional Summary

Courses

Number	Course Title	Term/Year	Credits	Enrollment
CBEE 414 ¹	Process Engineering Laboratory, Section 014	Fall 2015	3	17
CBEE 414 ¹	Process Engineering Laboratory, Section 017	Fall 2015	3	19
CBEE 414 ¹	Process Engineering Laboratory, Section 018	Fall 2015	3	17
HEST 399 ²	Engineering for Global Health Solutions	Spring 2016	3	11
CBEE 414 ³	Process Engineering Laboratory, Section 012	Fall 2016	3	24
CBEE 414 ³	Process Engineering Laboratory, Section 018	Fall 2016	3	24

CBEE 414 ³	Process Engineering Laboratory, Section 019	Fall 2016	3	24
HEST 399	Engineering for Global Health Solutions	Spring 2017	3	5
CBEE 414 ³	Process Engineering Laboratory, Section 013	Fall 2017	3	24
CBEE 414 ³	Process Engineering Laboratory, Section 017	Fall 2017	3	24
CBEE 414 ³	Process Engineering Laboratory, Section 018	Fall 2017	3	24
HEST 320	Engineering for Global Health Solutions	Spring 2018	3	21
BIOE 599	Drug and Medical Device Regulations in Technology Development	Spring 2018	2	8
CBEE 414 ³	Process Engineering Laboratory, Section 017	Fall 2018	3	21
CBEE 414 ³	Process Engineering Laboratory, Section 018	Fall 2018	3	21
CBEE 414 ³	Process Engineering Laboratory, Section 019	Fall 2018	3	22
HEST 320	Engineering for Global Health Solutions	Spring 2019	3	24
BIOE 513 Hybrid	Drug and Medical Device Regulations in Technology Development	Spring 2019	2	12
CBEE 414 ³	Process Engineering Laboratory, Section 018	Fall 2019	3	20
CBEE 414 ³	Process Engineering Laboratory, Section 019	Fall 2019	3	16
BIOE 420	Social Justice, Ethics, and Engineering, Section 001	Winter 2020	3	35
BIOE 420	Social Justice, Ethics, and Engineering, Section 010	Winter 2020	3	22
BIOE 513 Ecampus	Drug and Medical Device Regulations in Technology Development	Spring 2020	2	14
BIOE 513 Ecampus	Drug and Medical Device Regulations in Technology Development	Winter 2021	2	10
HEST 320	Engineering for Global Health Solutions	Spring 2021	3	23
BIOE 240	A Practical Introduction to Biosignals and Sensors	Spring 2021	3	13
BIOE 457/557	Bioreactors	Fall 2021	3	71/3
BIOE 513 Ecampus	Drug and Medical Device Regulations in Technology	Winter 2022	3	19

	Development			
BIOE 240	A Practical Introduction to Biosignals and Sensors	Spring 2022	3	28
BIOE 457/557	Bioreactors	Fall 2022	3	51/4
BIOE 513 Ecampus	Drug and Medical Device Regulations in Technology Development	Winter 2023	3	24
HEST 320 Ecampus	Engineering for Global Health Solutions	Winter 2023	3	26
BIOE 240	A Practical Introduction to Biosignals and Sensors, Section 001	Spring 2023	3	30
BIOE 240	A Practical Introduction to Biosignals and Sensors, Section 002	Spring 2023	3	30
BIOE 457/557	Bioreactors	Fall 2023	3	51/3
BIOE 240	A Practical Introduction to Biosignals and Sensors, Section 001	Spring 2024	3	38
BIOE 240	A Practical Introduction to Biosignals and Sensors, Section 002	Spring 2024	3	37

Student Evaluations

Course No.	Term	Enrollment	# Re-sponding	Student Evaluation Median (#1/#2)	Required /Elective
CBEE 414 014	Fall 2015	17	15	4.3/4.6	Required
CBEE 414 017	Fall 2015	19	13	4.4/5.0	Required
CBEE 414 018	Fall 2015	17	12	5.3/5.5	Required
HEST 399	Spring 2016	11	8	5.0/5.7	Elective
CBEE 414 012	Fall 2016	24	14	4.0/5.0	Required
CBEE 414 018	Fall 2016	24	16	5.0/5.3	Required
CBEE 414 019	Fall 2016	24	17	4.5/4.9	Required
HEST 399	Spring 2017	5	No data	No data	Elective
CBEE 414 013	Fall 2017	24	13	4.1/5.1	Required
CBEE 414 017	Fall 2017	24	9	3.7/4.2	Required
CBEE 414 018	Fall 2017	24	15	4.9/5.6	Required
HEST 320	Spring 2018	21	13	5.0/5.3	Elective
BIOE 599	Spring 2018	8	3	5.8/6.0	Required
CBEE 414 017	Fall 2018	21	4	4.0/4.5	Required
CBEE 414 018	Fall 2018	21	7	5.4/5.6	Required
CBEE 414 019	Fall 2018	22	8	5.5/5.8	Required
HEST 320	Spring 2019	24	12	5.7/5.7	Elective
BIOE 513 Hybrid	Spring 2019	12	4	5.5/5.5	Required
CBEE 414 018	Fall 2019	20	6	5.5/5.8	Required

CBEE 414 019	Fall 2019	16	7	5.6/5.6	Required
BIOE 420 001	Winter 2020	35	17	5.7/5.8	Required
BIOE 420 010	Winter 2020	22	5	5.7/5.7	Required
BIOE 513 Ecampus	Spring 2020	14	NA	No scores	Required
BIOE 513 Ecampus	Winter 2021	10	3	5.8/5.8	Required
HEST 320	Spring 2021	23	7	5.5/5.5	Elective
BIOE 240	Spring 2021	13	3	6.0/6.0	Elective
BIOE 457/557	Fall 2021	74(71/3)	17	5.7/5.8	Required
BIOE 513 Ecampus	Winter 2022	19	6	4.5/4.5	Required
BIOE 240	Spring 2022	28	7	5.8/5.8	Elective
BIOE 457/557	Fall 2022	55(51/4)	16	5.9/5.9	Required
BIOE 513 Ecampus	Winter 2023	24	7	5.8/5.8	Required
HEST 320 Ecampus	Winter 2023	26	8	5.7/5.7	Elective
BIOE 240 001	Spring 2023	30	5	5.3/5.7	Required
BIOE 240 002	Spring 2023	30	3	5.8/5.8	Required
BIOE 457/557	Fall 2023	54(51/3)	17	5.8/6.0	Required
BIOE 240 001	Spring 2024	38	9	5.9/6.0	Required
BIOE 240 002	Spring 2024	37	9	6.0/6.0	Required

Advising

Graduate Advisees (completed)

Student	Degree	Thesis	Graduated
1. Lael Wentland (student at OSU)	Ph.D.	<i>Development of Rapid Diagnostic Tools for Personal Health Monitors in the Context of Therapy Monitoring</i>	Summer 2022 (BIOE Schullien Outstanding Graduate Student Award)
2. Corey Downs (student at OSU)	Ph.D.	<i>Development of Microfluidic Assays and Flow Control Tools on Porous Materials: Towards a Wound-Health Monitoring Device</i>	Spring 2021 (CBEE Schullien Outstanding Graduate Student Award)
3. Mike Rodriguez (student at OSU)	M.S.	<i>Signal enhancement in lateral flow tests for infant HIV diagnosis</i>	Summer 2020
4. Robert Robinson (student at OSU)	M.S.	<i>Development of a Paper-based Whole Blood Phenylalanine Assay for PKU Diagnosis and Monitoring in Low-Resource Settings</i>	Spring 2016 (CBEE Schullien Outstanding Graduate Student Award)
5. Tinny Liang (student at UW)	M.S.	<i>Investigation of Reagent Delivery Formats and Implications for Higher-sensitivity Detection for Paper-based Diagnostics</i>	Fall 2014 (NSF Graduate Research Fellowship)
6. Greg Thiessen (student at UW)	M.S.	<i>Development of a Field-use Paper-based PKU Test using Colorimetric Readout</i>	Summer 2014

Undergraduate Research Assistants

1. Caleb Nejely (Summer 2024) – paid researcher
2. Adam Ramsey (Summer 2024) – paid researcher

3. Anders Ortensi (Summer 2024) – paid researcher
4. Joey Cardinalli (Summer 2024) – CWI Summer Intern 2024
5. Riley Schweizer (Fall 2023, Winter 2024, Spring 2024) – paid researcher
6. Teagan Rocheville-Higgins (Summer 2023, Fall 2023, Winter 2024, Spring 2024) – paid researcher
7. Lana Senten (Summer 2023, Fall 2023, Winter 2024, Spring 2024) – paid researcher
8. Zachariah Dieringer (Winter 2023, Spring 2023) – paid researcher
9. Kira Hallerbach (Summer 2022, Fall 2022, Winter 2023, Spring 2023) – paid researcher
10. Ander Switalla (Winter 2022, Spring 2022, Summer 2022, Fall 2022, Winter 2023, Spring 2023) – paid researcher, BIOE Outstanding Student Award 2023
11. Jade Minzlaff (Winter 2022, Spring 2022, Summer 2022, Fall 2022, Winter 2023) – paid researcher, 1st place student research poster at AIChE Pacific Northwest Regionals, April 2022
12. Natalie White (Summer 2019, Fall 2019, Winter 2020) – Johnson Intern 2019, paid researcher in 2019 and 2020, DeLoach Work Scholarship Spring 2021
13. Valerie Ranum (Winter 2019, Spring 2019, Summer 2019) – STEM Leader 2019 and Johnson Intern 2019
14. Kian Patel (Summer 2018, Fall 2018, Winter 2019, Spring 2019, Summer 2019) – Johnson Intern 2018, paid researcher in 2018 and 2019, CWI Summer Intern 2019
15. Rachel Polaski (Summer 2018, Fall 2018, Winter 2019, Spring 2019, Fall 2019, Winter 2020) – Johnson Intern 2018, paid researcher in 2018, 2019, and 2020, BIOE Outstanding Student Award 2021
16. Arianna Nejely (Summer 2017, Fall 2017, Winter 2018, Spring 2018, Fall 2018, Summer 2019, Fall 2019, Winter 2020) – Johnson Intern 2017, paid researcher in 2017, 2018, 2019, and 2020
17. Madeleine Adams (Fall 2017, Winter 2018, Spring 2018) – paid researcher in 2017 and funding from OSU Women and Minorities in Engineering (SemiConductor Research Corporation) in 2018
18. Kassie Odo (Summer 2017) – Johnson Intern 2017
19. Jensen Amens (Fall 2016, Winter 2017) – Sophomore Women’s Research Fellowship
20. Ian Abbene (Summer 2016) – paid researcher
21. Gary Gates (Summer 2016) – paid researcher
22. Caitlin Reid (Summer 2016, Fall 2017, Winter 2018) – Johnson Intern 2016, DeLoach Work Scholarship Fall 2017, paid researcher in 2018
23. David Cornwell (Summer 2015, Summer 2016) – Johnson Intern 2015, Johnson Second-year Intern 2016
24. Anthony To (Summer 2015 – Summer 2016) – paid researcher in 2015 and 2016
25. Jessalyn Imdieke (Summer 2014 – Spring 2017) – Johnson Intern 2014, Johnson Second-year Intern 2015, and paid researcher in 2015, 2016, and 2017
26. Liam Wong (Summer 2014) – Johnson Second-year Intern 2014
27. Wyatt Self (Summer 2014 – Dec. 2015) – Johnson Second-year Intern 2014 and paid researcher in 2015
28. Dylan Hinson (January 2014 – July 2016) – URSA ENGAGE 2014, Bioenergy Scholarships 2014 and 2015, and paid researcher in 2016
29. Brittney McKenzie (Summer 2012, and two quarters during the academic year) – NASA SURP 2012 and UW Mary Gates Scholarship 2012
30. Jeff Yang (Summer 2013) – paid researcher

31. Jared Houghtaling (Summers 2011 and 2012, and seven quarters during the academic year) – paid researcher, UW Mary Gates Scholarship 2012 and 2013, UW Bioengineering Scholarship 2013, Washington Research Foundation Scholarship 2013
32. Tinny Liang (Summers 2010, 2011, and 2012, and seven quarters during the academic year) – paid researcher, UW Mary Gates Scholarship 2012 (2×), UW Bioengineering Scholarship 2012, and Levinson Scholarship 2012

Publications

Refereed Journal Publications

1. **N. Lefevre, K. Khederlou, S.A. Ramsey, and E. Fu**, Electrochemical signal quantification in saliva: investigation of signal analysis methods, *Journal of Applied Electrochemistry*, doi.org/10.1007/s10800-024-02153-5 (2024). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. N. Lefevre was a graduate student in my group and K. Khederlou is a Ph.D. student in my group.)
2. **K. Hallerbach, K. Khederlou, L. Wentland, S. Brentano, B. Keefe, and E. Fu**, Protein-based anchoring methods for nucleic acid capture in a lateral flow format, *Micromachines*, doi: 10.3390/mi14101936 (2023). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. K. Hallerbach was an undergraduate researcher in my group, K. Khederlou is a graduate student in my group, and L. Wentland obtained her Ph.D. under my supervision and was then a post-doc in my group.)
3. **E. Fu, K. Khederlou, N. Lefevre, S.A. Ramsey, M.L. Johnston, and L. Wentland**, Progress on electrochemical sensing of pharmaceutical drugs in complex biofluids, accepted to *Chemosensors* 11, 467 (2023). (As first author, I wrote the majority of the review article. K. Khederlou and N. Lefevre are graduate students in my group and L. Wentland obtained her Ph.D. under my supervision and was then a post-doc in my group.)
4. **A. Switalla, L. Wentland, and E. Fu**, 3D printing-based microfluidic devices in fabric, *Journal of Micromechanics and Microengineering* 33, 11 (2023). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. A. Switalla was an undergraduate researcher in my group and L. Wentland obtained her Ph.D. under my supervision and was then a post-doc in my group.)
5. **L. Wentland, J. Cook, J. Minzlaff, S. A. Ramsey, M. Johnston, and E. Fu**, Field-use device for the electrochemical quantification of carbamazepine levels in a background of human saliva, *Journal of Applied Electrochemistry*, doi.org/10.1007/s10800-022-01785-9 (2022). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. L. Wentland was a Ph.D. student in my group and J. Minzlaff was an undergraduate researcher in my group.)
6. **L. Wentland, C. Downs, and E. Fu**, Comparison of signal enhancement strategies for carbamazepine detection in undiluted human saliva using an electrochemical sensor with stencil-printed carbon electrodes, *Analytical Methods* 14, 3103-3114 (2022). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. L. Wentland was a Ph.D. student in my group and C. Downs obtained his Ph.D. under my supervision and was then a post-doc in my group.)
7. **E. Fu and L. Wentland**, A survey of 3D printing technology applied to paper microfluidics, *Lab on a Chip* 22, 9-25 (2022). (A PhD student in my group, L. Wentland, and I shared co-first authorship. We both contributed to all aspects of this critical review, including curating the literature, writing critiques, making figures, and synthesizing our position statements.)
8. **L. Wentland, R. Polaski, and E. Fu**, Dry storage of multiple reagent types within a paper microfluidic device for phenylalanine monitoring, *Analytical Methods* 13, 660-671 (2021).

(As senior author, I had a major role in experimental design, analysis, interpretation, and writing. L. Wentland was a Ph.D. student in my group and R. Polaski was an undergraduate researcher in my group.)

9. **C. Downs**, M. Milovancev, and E. Fu, Rational design and characterization of a lateral flow assay for canine C-reactive protein in wound exudate, *Talanta* 220, 121319 (2020). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. C. Downs was a Ph.D. student in my group and M. Milovancev was our clinician collaborator in OSU Veterinary Medicine for this study.)
10. **L. Wentland**, **R. Polaski**, and E. Fu, Characterization methods in porous materials for the rational design of multi-step processing in the context of a paper microfluidic phenylalanine test, *Analytical Methods* 12, 768-780 (2020). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. L. Wentland was a Ph.D. student in my group and R. Polaski was an undergraduate researcher in my group.)
11. **C. Downs**, **A. Nejely**, and E. Fu, Integrated wax valve for robust fluid control in an electrochemical fabric-based device, *Analytical Methods* 11, 5098-5017 (2019). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. C. Downs was a Ph.D. student in my group and A. Nejely was an undergraduate researcher in my group.)
12. **C. Downs**, **A. Nejely**, and E. Fu, Disposable fabric-based electrochemical sensors fabricated from wax-transfer-printed fluidic cells and stencil-printed electrodes, *Analytical Methods* 10, 3696-3703 (2018). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. C. Downs was a Ph.D. student in my group and A. Nejely was an undergraduate researcher in my group.)
13. C. Anderson, C. Holstein, E. Strauch, S. Bennett, A. Chevalier, J. Nelson, E. Fu, D. Baker, and P. Yager, A rapid diagnostic assay for intact influenza virus using a high affinity hemagglutinin binding protein, *Analytical Chemistry* 89, 6608-6615 (2017). (I provided input into the work described in this article, serving as a project manager under PI P. Yager and as a committee member of graduate student C. Holstein.)
14. **J. Imdieke** and E. Fu, Porous stamp-based reagent patterning for lateral flow assays, *Analytical Methods* 9, 2751-2756 (2017). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. J. Imdieke was an undergraduate researcher in my group.)
15. S. Huang, K. Abe, S. Bennett, T. Liang, P. Ladd, L. Yokobe, C. Anderson, K. Shah, J. Bishop, M. Purfield, P. Kauffman, S. Paul, A. Welch, B. Strelitz, K. Follmer, K. Pullar, L. Sanchez-Erebia, E. Gerth-Guyette, G. Domingo, E. Klein, J. Englund, E. Fu, and P. Yager, Disposable autonomous device for rapid swab-to-result diagnosis of influenza, *Analytical Chemistry* 89, 5776-5783 (2017). (I provided critical input into the work described in this article, serving as a project manager under PI P. Yager and as a co-author of the proposal associated with this work.)
16. **A. To**, **C. Downs**, and E. Fu, Wax transfer printing to enable robust boundary definition in devices based on non-standard porous materials, *Journal of Micromechanics and Microengineering* 27, 057001 (6pp) (2017). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. A. To was an undergraduate researcher/Honors College student in my group and C. Downs was a Ph.D. student in my group.)
17. E. Fu and **C. Downs**, Progress in the development and integration of fluid flow control tools in paper microfluidics, *Lab on a Chip* 17, 614-628 (2017). (As first author, I was the primary author of this critical review. C. Downs was a Ph.D. student in my group.)

18. **T. Liang, R. Robinson, J. Houghtaling**, G. Fridley, S. A. Ramsey, and E. Fu, Investigation of reagent delivery formats in a multivalent malaria sandwich immunoassay and implications for assay performance, *Analytical Chemistry* 88, 2311-2320 (2016). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. T. Liang and R. Robinson were graduate students in my group, and J. Houghtaling was an undergraduate researcher/capstone student in my group.)
19. **R. Robinson, L. Wong**, R. J. Monnat Jr., and E. Fu, Development of a whole blood paper-based device for phenylalanine detection in the context of PKU therapy monitoring, *Micromachines* 7, 28-37 (2016). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. R. Robinson was a graduate student in my group and L. Wong was an undergraduate researcher/Honors College student in my group.)
20. C. A. Holstein, A. Chevalier, S. Bennett, C. E. Anderson, K. Keniston, C. Olsen, B. Li, B. Bales, D. R. Moore, E. Fu, D. Baker, and P. Yager, Immobilizing affinity proteins to nitrocellulose: a toolbox for paper-based assay developers, *Analytical and Bioanalytical Chemistry* 408, 1335-1346 (2015). (I provided key input into the work described in this article, serving as a project manager under PI P. Yager and as a committee member of graduate student C. Holstein.)
21. B. Toley, J. Wang, M. Gupta, J. Buser, L. Lafleur, B. Lutz, E. Fu, and P. Yager, A versatile valving toolkit for automating fluidic operations in paper microfluidic devices, *Lab on a Chip* 15, 1432-1444 (2015). (I provided key input into the early work described in this article as a co-mentor to the post-doc B. Toley.)
22. **G. Thiessen, R. Robinson, K. De Los Reyes**, R. Monnat, and E. Fu, Conversion of a laboratory-based test for phenylalanine detection to a simple paper-based format and implications for PKU screening in low-resource settings, *Analyst* 140, 609-615 (2015). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. G. Thiessen and R. Robinson were graduate students in my group, and K. De Los Reyes was an undergraduate researcher/capstone student in my group.)
23. E. Fu, Enabling robust quantitative readout in an equipment-free model of device development, *Analyst* 139, 4750-4757 (2014). (I was the sole author of this article.)
24. S. Ramachandran, E. Fu, B. Lutz, and P. Yager, Long-term dry storage of an enzyme-based reagent system for ELISA in point-of-care devices, *Analyst* 139, 1456-1462 (2014). (I provided key input into the work described in this article, including on the topic of experimental design and analysis.)
25. B. Toley, **B. McKenzie, T. Liang**, J. Buser, P. Yager, and E. Fu, Tunable-delay shunts for paper microfluidic devices, *Analytical Chemistry* 85, 11545-11552 (2013). (As senior author, I had a major role in experimental design, analysis, interpretation, and editing. B. McKenzie and T. Liang were undergraduate researchers/capstone students in my group, and I co-mentored the post-doc B. Toley.)
26. **J. Houghtaling, T. Liang, G. Thiessen**, and E. Fu, Dissolvable bridges for manipulating fluid volumes in paper networks, *Analytical Chemistry* 85, 11201-11204 (2013). (As senior author, I had a major role in experimental design, analysis, interpretation, and writing. G. Thiessen was a graduate student in my group, and T. Liang and J. Houghtaling were undergraduate researchers/capstone students in my group.)
27. S. Byrnes, **G. Thiessen**, and E. Fu, Progress in the development of paper-based diagnostics for low-resource point-of-care settings, *Bioanalysis* 5, 2821-2836 (2013). (I co-wrote this article. G. Thiessen was a graduate student in my group.)
28. P. Spicar-Mihalic, B. Toley, **J. Houghtaling, T. Liang**, P. Yager, and E. Fu, CO₂ laser cutting and ablative etching for the fabrication of paper-based devices, *Journal of Micromachining and Microengineering* 23, 067003 (2013). (As senior author, I had a major role in

- experimental design, analysis, interpretation, and writing. J. Houghtaling and T. Liang were undergraduate researchers/capstone students in my group. B. Toley was a post-doc I co-mentored, and P. Spicar-Mihalic was a post-doc I worked closely with on the project.)
29. B. Lutz, T. Liang, E. Fu, S. Ramachandran, P. Kaffman, and P. Yager, Dissolvable fluidic time delays for programming multi-step assays in instrument-free paper diagnostics, *Lab on a Chip* 13, 2840-2847 (2013). (I provided key input into the work described in this article, and an undergraduate student under my supervision, T. Liang, performed some of the experiments.)
 30. G. Fridley, H. Le, E. Fu, and P. Yager, Controlled release of dry reagents in porous media for tunable temporal and spatial distribution upon rehydration, *Lab on a Chip* 12, 4321-4327 (2012). (I provided key input into the work described in this article.)
 31. E. Fu, T. Liang, P. Spicar-Mihalic, J. Houghtaling, S. Ramachandran, and P. Yager, A two-dimensional paper network format that enables simple multi-step assays for use in low-resource settings in the context of malaria antigen detection, *Analytical Chemistry* 84, 4574-4579 (2012). (As first author, I wrote the initial draft of the manuscript and had a major role in experimental design, collection, analysis, and interpretation. T. Liang and J. Houghtaling were undergraduate researchers/capstone students in my group.)
 32. E. Fu, T. Liang, J. Houghtaling, S. Ramachandran, S. Ramsey, B. Lutz, and P. Yager, Enhanced sensitivity of lateral flow tests using a two-dimensional paper network format, *Analytical Chemistry* 83, 7941-7946 (2011). (As first author, I wrote the initial draft of the manuscript and had a major role in experimental design, collection, analysis, and interpretation. T. Liang and J. Houghtaling were undergraduate researchers/capstone students in my group.)
 33. B. Lutz, P. Trinh, C. Ball, E. Fu, and P. Yager, Two-dimensional paper networks: programmable fluidic disconnects for multi-step processes in shaped paper. *Lab on a Chip* 11, 4274-4278 (2011). (I provided some input into the work described in this article. Overall, my role was minor.)
 34. E. Fu, S. A. Ramsey, P. Kauffman, B. Lutz, and P. Yager, Transport in two-dimensional paper networks, *Microfluidics and Nanofluidics* 10, 29-35 (2011). (As first author, I wrote the initial draft of the manuscript and handled the experimental design, collection, analysis, and interpretation with some input from co-authors.)
 35. J. Osborn, B. Lutz, E. Fu, P. Kauffman, D. Stevens, and P. Yager, Microfluidics without pumps: translating adjacent flows onto paper networks, *Lab on a Chip* 10, 2659-2665 (2010). (I provided some key input into the work described in this article.)
 36. P. Kauffman, E. Fu, B. Lutz, and P. Yager, Visualization and measurement of flow in two-dimensional paper networks, *Lab on a Chip* 10, 2614-2617 (2010). (I had a major role in experimental design and the writing of the article.)
 37. E. Fu, P. Kauffman, B. Lutz, and P. Yager, Chemical signal amplification in two-dimensional paper networks, *Sensors and Actuators B* 149, 325-328 (2010). (As first author, I wrote the initial draft of the manuscript and handled the experimental design, collection, analysis, and interpretation with some input from co-authors.)
 38. E. Fu, B. Lutz, P. Kauffman, P. Yager, Controlled reagent transport in disposable 2D paper networks, *Lab on a Chip* 10, 918-920 (2010). (As first author, I wrote the initial draft of the manuscript and handled the experimental design, collection, analysis, and interpretation with some input from co-authors.)
 39. E. Fu, K. E. Nelson, S. A. Ramsey, J. O. Foley, K. Helton, P. Yager, Modeling of a competitive microfluidic heterogeneous immunoassay: sensitivity of the assay response to varying system parameters, *Analytical Chemistry* 81, 3407-3413 (2009). (As first author, I wrote the initial draft of the manuscript and handled the experimental design, collection, analysis, and interpretation with assistance from co-authors.)

40. K. Helton, K. Nelson, E. Fu, and P. Yager, Conditioning saliva for use in a microfluidic sensor, *Lab on a Chip* 8, 1847-1851 (2008). (I provided some input to the work described in this article. Overall, my role was minor.)
41. M. Hasenbank, T. Edwards, E. Fu, R. Garzon, T. Kosar, M. Look, A. Mashadi-Hosseini, and P. Yager, Demonstration of multi-analyte patterning using piezoelectric inkjet printing of multiple layers, *Analytica Chimica Acta* 611, 80-88 (2008). (I provided input to the work described in this article.)
42. J. Foley, A. Mashadi-Hosseini, E. Fu, B. Finlayson, and P. Yager, Experimental and model investigation of the time-dependent 2-dimensional distribution of binding in a herringbone microchannel, *Lab on a Chip* 8, 557-564 (2008). (I helped supervise graduate student J. Foley and contributed input to the work described in the article.)
43. J. Foley, E. Fu, L. Gamble, and P. Yager, Microcontact printed antibodies on gold surfaces: Function, uniformity, and silicone contamination, *Langmuir* 24, 3628-3635 (2008). (I helped supervise graduate student J. Foley and contributed input to the work described in the article.)
44. E. Fu, S. A. Ramsey, P. Yager, Dependence of the signal amplification potential of colloidal gold nanoparticles on resonance wavelength in surface plasmon resonance-based detection, *Analytica Chimica Acta* 599, 118-123 (2007). (As first author, I wrote the initial draft of the manuscript and handled the experimental design, collection, analysis, and interpretation with assistance from co-authors.)
45. M. Hasenbank, E. Fu, J. Nelson, D. Schwartz, and P. Yager, Investigation of heterogeneous electrochemical processes using multi-stream laminar flow in a microchannel, *Lab on a Chip* 7, 441-447 (2007). (I helped supervise graduate student M. Hasenbank and contributed to experimental design, analysis, interpretation, and writing of the article.)
46. K. Hawkins, M. Steedman, R. Baldwin, E. Fu, S. Ghosal, and P. Yager, A method for characterizing adsorption of flowing solutes to microfluidic surfaces, *Lab on a Chip* 7, 281-285 (2007). (I provided some input to the work described in this article. Overall, my role was minor.)
47. T. Chinowsky, M. Grow, K. Johnston, K. Nelson, T. Edwards, E. Fu, and P. Yager, Compact surface plasmon resonance imaging system for saliva-based medical diagnostics, *Biosensors and Bioelectronics* 22, 2208-2215 (2007). (I provided some input to the work described in this article. Overall, my role was minor.)
48. E. Fu, S. Ramsey, J. Chen, T. Chinowsky, B. Wiley, Y. Xia, and P. Yager, Resonance wavelength-dependent signal of absorptive particles in surface plasmon resonance-based detection, *Sensors and Actuators B* 123, 606-613 (2007). (As first author, I wrote the initial draft of the manuscript and handled the experimental design, collection, analysis, and interpretation with assistance from co-authors.)
49. M. Hasenbank, E. Fu, and P. Yager, Lateral spread of an amplification signal using an enzymatic system on a conductive surface, *Langmuir* 22, 7451-7453 (2006). (I helped supervise graduate student M. Hasenbank and contributed to experimental design, analysis, interpretation, and writing of the article.)
50. E. Fu, S. Ramsey, R. Thariani, and P. Yager, One-dimensional surface plasmon resonance imaging system using wavelength interrogation, *Review of Scientific Instruments* 77, 076106 (2006). (As first author, I wrote the initial draft of the manuscript and handled the experimental design, collection, analysis, and interpretation with assistance from co-authors.)
51. P. Yager, T. Edwards, E. Fu, K. Helton, K. Nelson, M. Tam, and B. Weigl, Microfluidic diagnostic technologies for global public health, *Nature* 442, 412-418 (2006). (I contributed key text to the article.)
52. M. S. Munson, M. S. Hasenbank, E. Fu, and P. Yager, Suppression of non-specific adsorption using sheath flow, *Lab on a Chip* 4, 438-445 (2004). (I contributed experimental work to the article.)

53. E. Fu, T. Chinowsky, J. Foley, J. Weinstein, and P. Yager, Characterization of a wavelength-tunable surface plasmon resonance microscope, *Review of Scientific Instruments* 75, 2300-2304 (2004). (As first author, I wrote the initial draft of the manuscript and handled the experimental design, collection, analysis, and interpretation with assistance from co-authors.)
54. E. Fu, J. Foley, and P. Yager, Wavelength-tunable surface plasmon resonance microscope, *Review of Scientific Instruments* 74, 3182-3184 (2003). (As first author, I wrote the initial draft of the manuscript and handled the experimental design, collection, analysis, and interpretation, with assistance from co-authors.)
55. E. S. Fu, X. S. Wang, and E. D. Williams, Characterization of structures fabricated by atomic force microscope lithography, *Surface Science* 438, 58-67 (1999). (This article is based on a chapter of my dissertation.)
56. C. J. Lanczycki, R. Kotlyar, E. Fu, Y.-N. Yang, E. D. Williams, and S. Das Sarma, Growth of Si on the Si(111) surface, *Physical Review B* 57, 13132-13148 (1998). (I helped collect data for the article.)
57. E. S. Fu, D.-J. Liu, M. D. Johnson, J. D. Weeks, and E. D. Williams, The effective charge in surface electromigration, *Surface Science* 385, 259-269 (1997). (As first author, I co-wrote the initial draft of the manuscript, collected and analyzed the experimental data, and had key input into the experimental design and interpretation.)
58. D.-J. Liu, E. S. Fu, M. D. Johnson, J. D. Weeks, and E. D. Williams, Relaxation of the step profile for different microscopic mechanisms, *Journal of Vacuum Science and Technology B* 14, 2799-2808 (1996). (I had a major role in the experimental work that is described in the article.)
59. E. S. Fu, M. D. Johnson, D.-J. Liu, J. D. Weeks, and E. D. Williams, Size-scaling in the decay of metastable structures, *Physical Review Letters* 77, 1091-1094 (1996). (As first author, I co-wrote the initial draft of the manuscript, collected and analyzed the experimental data, and had key input into the experimental design and interpretation.)
60. Y.-N. Yang, E. S. Fu, and E. D. Williams, An STM study of current-induced step bunching on Si(111), *Surface Science* 356, 101-111 (1996). (My role was minor.)
61. E. D. Williams, E. Fu, Y.-N. Yang, D. Kandel, and J. D. Weeks, Measurement of the anisotropy ratio during current-induced step bunching, *Surface Science* 336, L746-L752 (1995). (I collected and analyzed the experimental data, and contributed text to the article.)

Professional Meetings

Presentations

- Presentation, Point-of-care Diagnostics for Global Health & Biodefense, Virtual format, “Point-of-care monitoring of therapeutic drug levels for optimal dosing,” June 2023
- Contributed Talk, Microscale Separations and Bioanalysis Conference in Sensors and Biomarkers Session, Tallahassee, FL, “Signal to noise enhancement for carbamazepine detection in saliva: Progress in the development of a field-use device for the monitoring of epilepsy therapy drugs in saliva,” May 2023
- Invited Talk, Hewlett Packard Microtech Affinity Group Tech Talk, Virtual format, “Progress in the Development of ‘Paper’ Microfluidic Devices for Precision Health Applications,” September 2021
- Featured Presentation, Oregon Bioengineering Symposium 2019, Corvallis, OR, “Porous materials-based microfluidic sensors for field use in precision health applications,” November 2019
- Invited Keynote Talk, Microscale Separations and Bioanalysis Conference in Microfluidic Systems Innovations Session, Corvallis, OR, “Development and applications of porous materials-based microfluidic devices,” March 2019

- Invited Talk, American Chemical Society Conference in Paper Devices for Bioanalysis Session I, Boston, MA, “Development of porous materials-based microfluidic devices for precision health applications,” August 2018
- Invited Talk, 101st Canadian Chemistry Conference in Stingy with Sample: Microfluidic Analysis Platforms Session, Edmonton, Alberta, “Development of porous materials-based microfluidic devices for precision health applications,” May 2018
- Invited Talk, 3rd Microfluidics Congress: Utilizing microfluidic technologies as a tool for progressing medical research and patient care, London, England, “Development of porous microfluidic devices for precision health applications,” December 2017
- Invited Talk, Plenary Session of the AES Electrophoresis Society, San Francisco, CA, “Engineering paper microfluidic sensors for point-of-care applications in low-resource settings,” November 2016
- Invited Talk, SELECTBIO Point-of-care Diagnostics, Madrid, Spain, “Paper microfluidic sensors for point-of-care diagnostic applications in low-resource settings,” March 2016
- Invited Talk, IEEE NanoMed, Honolulu, HI, “Paper microfluidics for the conversion of lab-based testing to the home; example of phenylalanine monitoring,” November 2015
- Contributed Talk, *AVS Annual Meeting, San Jose CA* “Paper-based device for home phenylalanine monitoring from a sample of whole blood,” October 2015
- Contributed Talk, *BMES Annual Meeting, Tampa FL* “Home phenylalanine monitoring for PKU therapy in a paper-based device from whole blood,” October 2015
- Contributed Talk, *BMES Annual Meeting, San Antonio TX* “Conversion of a laboratory-based colorimetric assay to a field-use paper-based test for the detection of phenylketonuria in newborns,” October 2014
- Invited Talk, Point-of-Care Diagnostics Seminar Series, Berkeley, CA, “Engineering paper networks for point-of-care diagnostic applications in low-resource settings,” October 2013
- Contributed Talk, *BMES Annual Meeting, Seattle WA*, “Tunable time-delays for paper microfluidic devices,” September 2013
- Invited Talk, CMOS Emerging Technologies Research, Whistler, British Columbia, “Paper microfluidic bioassays for point-of-care diagnostics,” July 2013
- Invited Talk, Microwave Sensors and Biochips for Biomolecules and Cells Characterization Workshop at the IEEE International Microwave Symposium, Seattle, WA, “Microfluidics for point-of-care diagnostic applications in low-resource settings,” June 2013
- Invited Talk with B. Lutz and P. Yager, GE Global Research, Niskayuna, NY, “Introduction to paper microfluidics,” June 2012
- Contributed Talk, *BMES Annual Meeting, Hartford CT*, “Two-dimensional paper network format for amplified lateral flow assays,” October 2011
- Contributed Talk, *BMES Annual Meeting, Austin TX*, “Engineering paper networks for improved assay performance,” October 2010
- Invited Talk with B. Lutz and P. Yager, Naval Research Labs, Chemistry Division, Washington D.C., “Microfluidics 2.0,” August 2010
- Invited Talk with B. Lutz and P. Yager, National Institute of Biomedical Imaging and Bioengineering, Bethesda, MD, “Microfluidics 2.0,” August 2010
- Contributed Talk, *Oral-based Diagnostics Conference, Lake Lanier Islands GA*, “An SPR Imaging-Based Salivary Diagnostics System for the Detection of Small Molecule Analytes,” October 2006
- Contributed Talk, *AVS National Meeting, Minneapolis MN*, “Study of the Decay of Metastable Structures on Silicon,” October 1995

Participation at Invitational Workshops

- Panelist at the NSF-sponsored Workshop on Papertronics: Paper-based Electronics for the 21st Century, Arlington, VA, September 2016

Patents

1. Sequential delivery of fluid volumes and associated devices, systems and methods, U.S. Patent No. 11,098,346 B2 (with J. Bishop and 13 others).
2. Reagent patterning in capillarity-based analyzers and associated systems and methods, U.S. Patent No. 9,528,987 (with P. Yager, B. Lutz, G. Fridley, H. Le, and P. Kauffman).
3. Chemical sensor enhanced by direct coupling of redox enzyme to conductive surface; U.S. Patent No. 7,364,886, 2010 (with M. Hasenbank and P. Yager).
4. Signal amplification method for surface plasmon resonance-based chemical detection; U.S. Patent No. 7,405,054, 2008 (with M. Hasenbank, K. Nelson, and P. Yager).
5. Wavelength tunable surface plasmon resonance sensor; U.S. Patent No. 7,030,989, 2006 (with P. Yager).

University Service

- OSU Bioengineering Graduate Program Admissions and Recruitment Committee, 2023-present
- OSU COE FSC 2022-2023
- OSU Bioengineering Graduate Program Curriculum Committee, 2020-present
- OSU/UO Joint Bioengineering Graduate Program Executive Committee, 2020-present
- OSU CBEE Faculty Status Committee, 2019-2023, 2024-present
- OSU Humanitarian Engineering Undergraduate/Graduate Program Committee, 2017-present
- OSU Bioengineering Faculty Search Committee – Chair, 2020-2021
- OSU CBEE Ongoing Education Committee, 2020-2021
- OSU COE Orange & Black Day Volunteer, 2021, 2022, 2023, 2024
- OSU BMES Student Club Advisor, 2020-present
- OSU CBEE ABET Committee, 2019-2021 (period covers an evaluation year)
- OSU Search Advocate Training, 2020, Update Training in 2022
- OSU CBEE Teaching Task Force, 2019
- OSU COE Graduate Research Showcase Poster Judge, 2019
- OSU Bioengineering Faculty Search Committee, 2016-2017, 2018-2019, 2021-2022, 2023-2024
- OSU COE CIC Committee 2020
- OSU Bioengineering Admissions and Recruiting Committee, 2016-2017, 2018-2019
- OSU COE Change Team, 2016-2018
- OSU CBEE Inclusivity Committee, 2016
- OSU CHE Graduate Student Progression Subcommittee – Chair, 2015-2016
- OSU Chemical Engineering Graduate Committee, 2014-2016
- OSU COE Strategic Planning Task Force 2, 2014
- OSU CBEE Interim Head and Head Search Committee, 2014
- OSU Host Lab for SESEY Students, 2014, 2015, 2016, 2017, 2018, 2019, 2022

- UW Bioengineering Student Affairs Committee Member, 2011-2013
- UW Chemical Engineering Faculty Search Committee, 2011
- UW Bioengineering Safety Committee, 2004-2007
- UW Mary Gates Scholarship Reviewer, 2013
- UW Levinson Scholarship Reviewer, 2013
- UW Undergraduate Research Symposium Moderator, 2013
- UW Host for Board of Regents Bioengineering Lab Tour, 2012
- UW Engineering Discovery Days Participant, 2010, 2011
- University Seminars
 - OSU CBEE Seminar, “Progress in the Development of ‘Paper’ Microfluidic Devices for Precision Health Applications,” May 2020
 - Oregon University-Industry Bioscience Symposium, “Development of paper-based devices for precision health,” June 2017
 - OSU Veterinary Medicine Seminar, “Paper microfluidic sensors for point-of-care diagnostic applications in low-resource settings,” January 2016
 - OSU Pharmacy Seminar, “Paper microfluidic sensors for point-of-care diagnostic applications in low-resource settings,” December 2015
 - OSU Physics SSO Seminar, “Paper microfluidic sensors for point-of-care diagnostic applications in low-resource settings,” May 2015
 - OSU CBEE Seminar, “Engineering paper networks for point-of-care diagnostic applications in low-resource settings,” January 2014
 - UW Analytical Chemistry Seminar, “Engineering paper networks for point-of-care diagnostics in low-resource settings,” May 2013

Service to the Profession

Journal Editorships

- PLOS ONE Editorial Board Academic Editor, February 2023-present

Conference and Workshop Organization

- Member of the Organizing Committee, 5th Annual Oregon Bioengineering Symposium, Eugene, OR, 2023
- Co-chair of the BMES Nano and Micro Technologies Track, San Antonio, TX, October 2022 – Developed program for nine sessions within the track with my co-chair
- Co-chair of the 4th Annual Oregon Bioengineering Symposium, Corvallis, OR, October 2022 – Led program development and implementation for the in-person sessions (including presentations, posters, and industry panels) on the OSU campus and the associated virtual poster session
- Member of the Organizing Committee, Inaugural Oregon Bioengineering Symposium, Corvallis, OR, November 2019
- Member of the Conference Programming Committee, Microscale Separations and Bioanalysis, Corvallis, OR, March 2019
- Co-organizer, Capillarity-based Microfluidics for Bioanalysis Workshop, Seattle, WA, October 2011
- Member of the Local Organizing Committee, MicroTAS Conference, October 2011

Conference Program Committees

- Session Co-Chair, Innovations in Nano and Micro Biosensing and Bioanalysis, BMES Annual Meeting, Seattle, WA, October 2023
- Session Chair, Innovations in Microfluidic Systems, Microscale Separations and Bioanalysis Conference, Virtual format, July 2021
- Session Chair, Bioanalytical Devices for Precision Health Applications, Microscale Separations and Bioanalysis Conference, Corvallis, OR, March 2019
- Session Chair, Case Studies and Applications in Medical Research, 3rd Microfluidics Congress: Utilizing microfluidic technologies as a tool for progressing medical research and patient care, London, England, December 2017
- Session Discussion Leader, Living Systems, Microfluidics, Physics and Chemistry of Forces, Fields, and Flows in Biological, Energy, and Manufacturing Applications of Microfluidics Gordon Research Conference, Barga, Italy, June 2017
- Session Co-Chair, Global Health II Session, BMES Annual Meeting, San Antonio, TX, October 2014
- Session Co-Chair, Emerging Technologies II Session, BMES Annual Meeting, Seattle, WA, September 2013
- Session Co-Chair, Sensors Session, CMOS Emerging Technologies Research, Whistler, British Columbia, July 2013

Reviewing

- NIH proposal reviewing:
 - NIH BBT Special Emphasis Panel: Bioengineering, Biomaterials, and Instrumentation, ZRG1 BBT-T(82), Video conference, July 2024
 - NIH BBT Special Emphasis Panel: Special Topics in Instrumentation and Systems Development, ZRG1 BBT-D(81), Video conference, November 2022
 - NIH Instrumentation and Systems Development (ISD) Study Section, Video conference, February 2022
 - NIH NCI Special Emphasis Review Panel, Novel Technologies for Global Health, ZCA1 TCRB-Q(J2), Video conference, November 2021
 - NIH PAR Panel: Technology Development and Research for Coronavirus Disease 2019 (Agenda Seq Num - 404451), Video conference, September 2020
 - NIH Interdisciplinary Molecular Sciences and Training (IMST)-J (10) Small Business: Biological Chemistry, Biophysics, and Assay Development Study Section, Video conference, July 2020
 - NIH Instrumentation and Systems Development (ISD) Study Section, Chevy Chase, MD, October 2019
 - NIH Instrumentation and Systems Development (ISD) Study Section, Chevy Chase, MD, October 2018
 - NIH Interdisciplinary Molecular Sciences and Training (IMST) Integrated Review Group ZRG1 Cellular and Molecular Technologies F (01)Q, Bethesda, MD, October 2017
 - NIH NHLBI Special Emphasis Review Panel, Onsite Tools and Technologies for Heart, Lung, and Blood Clinical Research Point-of-Care, ZHL1 CSR-O (O2) R, Bethesda, MD, July 2015

- NIH NHLBI Special Emphasis Review Panel, Neonatal and Pediatric Blood Testing, ZHL1 CSR-C (O1) 1, Teleconference, June 2015
- NIH Small Business: Basic and Integrative Bioengineering Special Emphasis Review Panel, ZRG1 IMST-M (13), Chevy Chase, MD, November 2014
- NIH NHLBI Special Emphasis Review Panel, Microfluidic Blood Assays, ZHL1 CSR-C (S1), Bethesda, MD, June 2014
- NIH NHLBI Special Emphasis Review Panel, Sickle Cell Disease Diagnostics, ZHL1 CSR-C (M1), Potomac, MD, March 2014
- NIH SBIR/STTR Proposals, Stage One, Special Emphasis Panels, ZRG1 IMST 13, February 2013, May 2012, February 2012, October 2011
- NSF proposal reviewing:
 - Biosensing Program Panel, P190709, Video conference, February 2019
- Other proposal/project reviewing:
 - NIH-funded Atlanta Center for Microsystems-Engineered Point of Care Technologies, 2019
 - Pennsylvania Department of Health, 2017, 2020
 - Florida Department of Health, 2016
 - Thiel Foundation Breakout Labs, 2016
 - European Union Project Proposals for Horizon 2020, 2014
- Journal article reviewing:
 - ACS Sensors, Analyst, Analytical and Bioanalytical Chemistry, Analytical Chemistry, Analytical Methods, Analytica Chimica Acta, Bioanalysis, Biomicrofluidics, Biosensors and Bioelectronics, Globalization and Health, Lab on a Chip, Nature Nanotechnology, Proceedings of the National Academy of Sciences, Review of Scientific Instruments, Sensors and Actuators B, Trends in Biotechnology
- Conference abstract reviewing:
 - Biomedical Engineering Society Annual Symposium Abstracts, 2024
 - Biomedical Engineering Society Annual Symposium Abstracts, 2023
 - Biomedical Engineering Society Annual Symposium Abstracts, 2022
 - Biomedical Engineering Society Annual Symposium Abstracts, 2021
 - Biomedical Engineering Society Annual Symposium Abstracts, 2020
 - Biomedical Engineering Society Annual Symposium Abstracts, 2017
 - Biomedical Engineering Society Annual Symposium Abstracts, 2014
 - Biomedical Engineering Society Annual Symposium Undergraduate Abstracts, 2014

Awards

- Warwick Family Faculty Scholar, Oregon State University, 2022-2025 (\$30K over three years)
- Valley Foundation Biohealth Fellow, Oregon State University, 2022
- Carter Award (in recognition of outstanding and inspirational teaching), College of Engineering, Oregon State University, 2022
- Bioengineering Special Award, Department of Bioengineering, University of Washington, 2006

Professional Development

- DPO Foundations Academy Participant, Summer 2024

- OSU Writing Intensive Curriculum Seminar Participant, Spring 2024
- Active Learning in Engineering Courses – Applications and Examples, 2024
- OSU ADVANCE Seminar Participant, 2015