

Parker S. Ruth

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My research lies in the intersection of computing, engineering, and medicine. I'm currently designing sensors and algorithms to measure digital biomarkers of neuromuscular and cardiovascular health. I am fortunate to work closely with mentors and collaborators in computer science, statistics, bioengineering, and medicine.

Education

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|---|---------------------------------|-------------|
| Stanford University | PhD, Computer Science | 2021 – 2027 |
| Stanford University | MS, Computer Science | 2021 – 2024 |
| Fellowships: NSF GRFP, NIH F31 | | |
| Thesis Committee: James Landay, Scott Delp, Todd Coleman, Emily Fox, Alison Marsden | | |
| University of Washington | BS, Bioengineering | 2016 – 2021 |
| University of Washington | BS, Computer Engineering | 2016 – 2021 |
| College Honors, <i>summa cum laude</i> GPA 3.96 | | |
| Research Mentors: Shwetak Patel, Edward Wang | | |

Awards and Honors

Grants & Fellowships

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| NIH F31 Predoctoral Fellowship, \$148,000 | 2025 |
| Wu Tsai Human Performance Alliance Seed Grant, \$200,000 | 2024 |
| Tau Beta Pi Fellowship, \$10,000 | 2021 |
| National Science Foundation Graduate Research Fellowship, \$138,000 | 2021 |

National Awards and Honors

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| Hertz Fellowship Finalist | 2022 |
| CRA Outstanding Undergraduate Researcher Award Finalist | 2020, 2021 |
| Barry Goldwater Scholarship | 2020 |
| Davidson Fellows Scholarship Honorable Mention | 2016 |
| National Merit Scholarship | 2016 |

University of Washington Awards and Honors

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| Paul G. Allen School Outstanding Senior Award | 2021 |
| Paul G. Allen School Best Senior Thesis Award | 2021 |
| College of Engineering Dean's Medal for Academic Excellence | 2021 |
| Annual Dean's List | 2017 – 2020 |
| Husky 100 Award | 2020 |
| Mary Gates Research Scholarship | 2018, 2020 |
| Levinson Emerging Scholars Award | 2019 |
| Microsoft Endowment Scholarship | 2019 |
| Patricia G. Lynch and Theodora & Eugene Russell Memorial Scholarship | 2019 |
| Tau Beta Pi Engineering Honors Society | 2018 |
| Washington Research Foundation Fellowship | 2018 |
| Mary Gates Leadership Scholarship | 2018 |
| Mary Gates Achievement Scholarship | 2017 |

Publications and Invited Talks

Peer Reviewed Publications

- [1] **Parker S. Ruth**, Scott D. Uhlich, Constance de Monts, Antoine Falisse, Julie Muccini, Sydney Covitz, Shelby Vogt-Domke, John Day, Tina Duong, and Scott L. Delp. **Video-Based Biomechanical Analysis Captures Disease-Specific Movement Signatures of Different Neuromuscular Diseases**
New England Journal of Medicine Artificial Intelligence (NEJM AI), 2(9):Aloa2401137, August 2025
[10.1056/AIoa2401137](https://doi.org/10.1056/AIoa2401137)
- [2] Alvin Cao, Ken Christofferson, **Parker S. Ruth**, Naveed Rabbani, Yuanchun Shi, Alex Mariakakis, Yuntao Wang, and Shwetak Patel. **EarSteth: Cardiac Auscultation Audio Reconstruction Using Earbuds**
46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), pages 1–4, July 2024
[10.1109/EMBC53108.2024.10781641](https://doi.org/10.1109/EMBC53108.2024.10781641)
- [3] Jason S. Hoffman, Matthew Hirano, Nuttada Panpradist, Joseph Breda, **Parker S. Ruth**, Yuanyi Xu, Jonathan Lester, Bichlien H. Nguyen, Luis Ceze, and Shwetak N. Patel. **Passively sensing SARS-CoV-2 RNA in public transit buses**
Science of The Total Environment, 821:152790, May 2022. ISSN 0048-9697
[10.1016/j.scitotenv.2021.152790](https://doi.org/10.1016/j.scitotenv.2021.152790)
- [4] Justin D. Vrana, Nuttada Panpradist, Nikki Higa, Daisy Ko, **Parker S. Ruth**, Ruth Kanthula, James J. Lai, Yaoyu Yang, Samar R. Sakr, Bhavna Chohan, Michael H. Chung, Lisa M. Frenkel, Barry R. Lutz, Eric Klavins, and Ingrid A. Beck. **Implementation of an interactive mobile application to pilot a rapid assay to detect HIV drug resistance mutations in Kenya**
PLOS Global Public Health, 2(2):e0000185, February 2022. ISSN 2767-3375
[10.1371/journal.pgph.0000185](https://doi.org/10.1371/journal.pgph.0000185)
- [5] Jackson J. Wallner, Ingrid A. Beck, Nuttada Panpradist, **Parker S. Ruth**, Humberto Valenzuela-Ponce, Maribel Soto-Nava, Santiago Ávila-Ríos, Barry R. Lutz, and Lisa M. Frenkel. **Rapid Near Point-of-Care Assay for HLA-B*57:01 Genotype Associated with Severe Hypersensitivity Reaction to Abacavir**
AIDS Research and Human Retroviruses, 37(12):930–935, December 2021. ISSN 0889-2229
[10.1089/aid.2021.0103](https://doi.org/10.1089/aid.2021.0103)
- [6] Nuttada Panpradist, Qin Wang, **Parker S. Ruth**, Jack H. Kotnik, Amy K. Oreskovic, Abraham Miller, Samuel W. A. Stewart, Justin Vrana, Peter D. Han, Ingrid A. Beck, Lea M. Starita, Lisa M. Frenkel, and Barry R. Lutz. **Simpler and faster Covid-19 testing: Strategies to streamline SARS-CoV-2 molecular assays**
eBioMedicine, 64:103236, February 2021. ISSN 2352-3964
[10.1016/j.ebiom.2021.103236](https://doi.org/10.1016/j.ebiom.2021.103236)
- [7] **Parker S. Ruth**, Jerry Cao, Millicent Li, Jacob E. Sunshine, Edward J. Wang, and Shwetak N. Patel. **Multi-Channel Facial Photoplethysmography Sensing**
42nd Annual International Conference of the IEEE Engineering in Medicine Biology Society (EMBC), pages 4179–4182, July 2020
[10.1109/EMBC44109.2020.9176700](https://doi.org/10.1109/EMBC44109.2020.9176700)
- [8] Nuttada Panpradist, Ingrid A. Beck, **Parker S. Ruth**, Santiago Ávila-Ríos, Claudia García-Morales, Maribel Soto-Nava, Daniela Tapia-Trejo, Margarita Matías-Florentino, Hector E. Paz-Juarez, Silvia del Arenal-Sanchez, Gustavo Reyes-Terán, Barry R. Lutz, and Lisa M. Frenkel. **Near point-of-care, point-mutation test to detect drug resistance in HIV-1: A validation study in a Mexican cohort**
AIDS, 34(9):1331–1338, July 2020. ISSN 0269-9370
[10.1097/QAD.0000000000002524](https://doi.org/10.1097/QAD.0000000000002524)
- [9] Nuttada Panpradist, Ingrid A. Beck, Justin Vrana, Nikki Higa, David McIntyre, **Parker S. Ruth**, Isaac So, Enos C. Kline, Ross Milne, Ruth Kanthula, Annie Wong-On-Wing, Jonathan Lim, Daisy Ko, Theresa Rossouw, Ute D. Feucht, Michael Chung, Gonzague Jourdain, Nicole Ngo-Giang-Huong, Laddawan Laomanit, Jaime Soria, James Lai, Eric E. Klavins, Lisa M. Frenkel, and Barry R. Lutz. **OLA-Simple: a software-guided HIV-1 drug resistance test for low-resource laboratories**
eBioMedicine, 50:34–44, December 2019. ISSN 2352-3964
[10.1016/j.ebiom.2019.11.002](https://doi.org/10.1016/j.ebiom.2019.11.002)

Conference Posters and Abstracts

- [10] C. De Monts De Savasse, **Parker S. Ruth**, S. Ulrich, S. Vogt-Domke, S. Ismail, L. Karman, A. Falisse, J. Muccini, S. Covitz, J. Day, S. Delp, and T. Duong. **Video-based biomechanical analysis captures disease-specific movement signatures of myotonic dystrophy and facioscapulohumeral muscular dystrophy**
Neuromuscular Disorders, 53:105735. ISSN 0960-8966
[10.1016/j.nmd.2025.105735](https://doi.org/10.1016/j.nmd.2025.105735)
- [11] C. De Monts De Savasse, **Parker S. Ruth**, S. Ulrich, S. Vogt-Domke, S. Ismail, L. Karman, A. Falisse, J. Muccini, S. Covitz, J. Day, S. Delp, and T. Duong. **Towards Video-Based Movement Biomarkers for Neuromuscular Diseases**
Converging Clinical and Engineering Research on Neurorehabilitation V, pages 501–504
[10.1007/978-3-031-77584-0_98](https://doi.org/10.1007/978-3-031-77584-0_98)
- [12] **Parker S. Ruth**, Constance de Monts, Scott Uhlrich, Julie Muccini, Paxton Ataide, Antoine Falisse, John Day, Scott Delp, and Tina Duong. **Digital Movement Biomarkers for Neuromuscular Diseases from Smartphone Videos**
Myotonic Dystrophy Foundation Annual Conference, September 2023

Invited Talks

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| [1] Towards Smartphone Video-Based Biomarkers of Human Movement University of Washington Ubiquitous Computing Seminar | 3/2025 |
| [2] Towards Smartphone Video-Based Biomarkers of Human Movement University of California San Diego Design Lab Meeting | 2/2025 |
| [3] Scalable Kinematic Analysis Using Smartphone Videos: Towards Movement Biomarkers for Neuromuscular Diseases MR3 Network 2023 Scientific Retreat | 9/2023 |

Teaching Experience

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| Course Assistant, CS 347 Human-Computer Interaction: Foundations and Frontiers | 1/2024 – 3/2024 |
| <ul style="list-style-type: none"> Led weekly discussion sections on seminal literature in human-computer interaction Wrote quizzes and graded reading reflection assignments Lectured on Human-Computer Interaction and Health Course evaluation teaching effectiveness 4.81 / 5.00 | |
| Instructor, CSE 590U Ubiquitous Computing Graduate Seminar | 9/2019 – 6/2020 |
| <ul style="list-style-type: none"> Led weekly discussion section with guest presenters and paper critique Topics included interaction techniques, wearables, novel sensing, and pervasive computing | |
| Co-instructor, BIOEN 217 MATLAB Fundamentals For Bioengineers | 9/2019 – 12/2019 |
| <ul style="list-style-type: none"> Co-instructed seminar introducing programming in MATLAB with biomedically relevant examples Prepared and delivered lectures, graded coding assignments, and supported course development | |
| Author, Biosignal Processing Course Text | 8/2018 – 9/2020 |
| <ul style="list-style-type: none"> Wrote 140-page course text for UW bioengineering sensors course Covers signal acquisition, Fourier analysis, digital and analog filters, and linear systems | |

Service

Peer Reviewing

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| • Journal of Shoulder and Elbow Surgery | 10/2025 |
| • Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies | 3/2025 |
| • ACM CHI conference on Human Factors in Computing Systems, late-breaking work | 2/2024 |

Mentorship

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| • Sohan Chunduru (Stanford University) | 1/2026 – Present |
| • Indu Gadiraju (Stanford University) | 1/2026 – Present |
| • Lily O'Brien (Stanford University) | 6/2025 – Present |
| • Chloe Zhong (Stanford University) | 3/2025 – Present |
| • Milly Wong (Stanford University) | 3/2025 – Present |
| • Nathalie Moreno (Stanford University) | 10/2024 – 12/2025 |
| • Tommy DeBenedetti (Stanford University) | 6/2024 – Present |
| • Ron Polonsky (Stanford University) | 3/2025 – 6/2025 |
| • Eli Waldman (Stanford University) | 3/2025 – 6/2025 |
| • Amanda Phan (Stanford University) | 1/2025 – 6/2025 |
| • Morayo Adeyemi (Howard University) | 6/2024 – 9/2024 |
| • Jordan Rodriguez (University of Arizona) | 6/2024 – 9/2024 |
| • Ege Turan (Stanford University) | 10/2023 – 12/2023 |
| • Alexandra Collins (Stanford University) | 6/2023 – 9/2023 |
| • Hamad Musa (Stanford University) | 6/2023 – 9/2023 |

Stanford Dean's Graduate Student Advisory Council

9/2024 – 6/2025

- Lead initiative to implement individual development plans across School of Engineering
- Create first School of Engineering student experience feedback survey
- Foster inter-department social connections through event funding

UW Bioengineering Department Curriculum Committee

9/2018 – 6/2020

- Selected to represent undergraduate cohort on department curriculum committee
- Discuss improvements to department curriculum and student programs
- Collect student feedback and propose solutions to improve the academic experience
- Represented BioE and CSE programs during ABET accreditation site visit

Volunteering and Outreach

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| • Reviewer, Stanford Computer Science Faculty Search Committee | 12/2025 |
| • Presenter, Stanford EXPLORE High School Outreach Program | 7/2025 |
| • Demonstrator, Stanford School of Engineering Centennial Showcase | 5/2025 |
| • Workshop Mentor, OpenSim+ Advanced Workshop, Neuromuscular Biomechanics Lab | 3/2025 |
| • Workshop Facilitator, Co-design for Healthcare and Assistive Technology | 3/2025 |
| • Volunteer, Stanford Computer Science Application Support Program | 12/2024 |
| • Workshop Facilitator, LINXS Computer Science Outreach Research Program | 7/2024 |
| • Reviewer, Stanford Computer Science PhD Admissions Committee | 12/2022, 12/2023 |
| • Volunteer, Stanford Computer Science Application Support Program | 12/2023 |
| • Presenter, UW Computer Science CS4Teachers outreach event | 7/2019 |
| • Volunteer, UW Engineering Discovery Days | 4/2018, 4/2019 |

Employment**Venture Associate, Alsop Louie Partners**

6/2021 – Present

Campus Associate, Alsop Louie Partners

6/2020 – 6/2021

- Prospect potential venture capital investments in biotechnology and personalized medicine
- Advise on emerging trends and disruptive technologies