

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 , Stanford, CA PhD Student, Computer Science Department | 2021 – 2027 |
| University of Washington , Seattle, WA BS in Bioengineering, BS in Computer Engineering College Honors; <i>summa cum laude</i> GPA 3.96 | 2016 – 2021 |

Publications and Talks

Peer Reviewed Publications

- [1] **Parker S. Ruth**, Scott D. Uhlrich, 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. *NEJM AI*, 2(9):Aloa2401137, August 2025. DOI: [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. In *2024 46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, pages 1–4, July 2024. DOI: [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. DOI: [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. DOI: [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. DOI: [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. DOI: [10.1016/j.ebiom.2021.103236](https://doi.org/10.1016/j.ebiom.2021.103236)
- [7] 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. DOI: [10.1097/QAD.0000000000002524](https://doi.org/10.1097/QAD.0000000000002524)

- [8] 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 2019b. ISSN 2352-3964. DOI: [10.1016/j.ebiom.2019.11.002](https://doi.org/10.1016/j.ebiom.2019.11.002)

Conference Posters and Abstracts

- [9] Scott D. Uhlrich, **Parker S. Ruth**, Constance de Monts, Antoine Falisse, Julie Muccini, Paxton Ataide, John Day, Tina Duong, and Scott L. Delp. Towards Video-Based Movement Biomarkers for Neuromuscular Diseases. In Jose L. Pons, Jesus Tornero, and Metin Akay, editors, *Converging Clinical and Engineering Research on Neurorehabilitation V*, pages 501–504, Cham, December 2024. Springer Nature Switzerland. ISBN 978-3-031-77584-0. DOI: [10.1007/978-3-031-77584-0_98](https://doi.org/10.1007/978-3-031-77584-0_98)
- [10] **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. In *Myotonic Dystrophy Foundation Annual Conference*, September 2023
- [11] **Parker S. Ruth**, Jerry Cao, Millicent Li, Jacob E. Sunshine, Edward J. Wang, and Shwetak N. Patel. Multi-Channel Facial Photoplethysmography Sensing. In *42nd Annual International Conference of the IEEE Engineering in Medicine Biology Society (EMBC)*, pages 4179–4182, July 2020. DOI: [10.1109/EMBC44109.2020.9176700](https://doi.org/10.1109/EMBC44109.2020.9176700)
- [12] Nuttada Panpradist, Ingrid A. Beck, **Parker S. Ruth**, Santiago Avila-Rios, Claudia García-Morales, Maribel Soto-Nava, Daniela Tapia-Trejo, Margarita Matias-Florentino, Hector E. Paz-Juarez, Silvia del Arenal-Sanchez, Gustavo Reyes-Teran, Barry R. Lutz, and Lisa M. Frenkel. Development and evaluation of a low-cost drug resistance test “OLA-Simple” for non-nucleoside-based ART for Mexico’s HIV population. In *International AIDS Society Conference on HIV Science*, July 2019a
- [13] Nuttada Panpradist, Ingrid A. Beck, Justin Vrana, Nikki Higa, David McIntyre, **Parker S. Ruth**, Isaac So, Enos Kline, Ross Milne, Ruth Kanthula, Annie Wong-On-Wing, Jonathan Lim, Daisy Ko, Theresa Rossouw, Ute Feucht, Michael Chung, Gonzague Jourdain, Nicole Ngo-Giang-Huong, Laddawan Laomanit, Jaime Soria, James Lai, Eric Klavins, Lisa M. Frenkel, and Barry R. Lutz. OLA Simple: a software-guided assay that novices can perform to genotype HIV DNA and RNA subtypes A, B, C, D and E for detection of drug resistance. In *International Workshop on HIV Drug Resistance and Treatment Strategies*, October 2018

Invited Talks

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| [T-1] Towards Smartphone Video-Based Biomarkers of Human Movement University of Washington Ubiquitous Computing Seminar | 3/2025 |
| [T-2] Towards Smartphone Video-Based Biomarkers of Human Movement University of California San Diego Design Lab Meeting | 2/2025 |
| [T-3] Scalable Kinematic Analysis Using Smartphone Videos: Towards Movement Biomarkers for Neuromuscular Diseases MR3 Network 2023 Scientific Retreat | 9/2023 |
| [T-4] Multi-Channel Facial Photoplethysmography Sensing 42nd Annual International Conferences of the IEEE Engineering in Medicine and Biology Society (EMBC) | 7/2020 |

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 | |

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| 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 Signals and Sensors for Bioengineers course • Covers signal acquisition, Fourier analysis, digital and analog filters, and linear systems • More information available at parkersruth.com/biosignal-processing | |

Service

Mentorship

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| • 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 – Present |
| • 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

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| | 9/2024 – 6/2025 |
| <ul style="list-style-type: none"> • 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

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| | 9/2018 – 6/2020 |
| <ul style="list-style-type: none"> • 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 | |

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 |

Volunteering and Outreach

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| • 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

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 |

Employment

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| Venture Associate, Alsop Louie Partners | 6/2021 – Present |
| Campus Associate, Alsop Louie Partners | 6/2020 – 6/2021 |
| <ul style="list-style-type: none"> • Prospect potential venture capital investments in biotechnology and personalized medicine • Advise on emerging trends and disruptive technologies | |