Stanford

# Shima Salehi

Assistant Professor (Research) of Education

Graduate School of Education

### CONTACT INFORMATION

- **Admin Support**

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## Bio

### BIO

Shima Salehi is a Research Assistant Professor at Stanford Graduate School of Education, and the director of IDEAL research lab, the research component of Stanford IDEAL initiative to promote inclusivity, diversity, equity and access in learning communities. Her research focuses on how to use different instructional practices to teach science and engineering more effectively and inclusively. For effective science and engineering education, Dr. Salehi has studied effective scientific problem-solving and developed empirical framework for main problem-solving practices to train students in. Based on these findings, she has designed instructional activities to provide students with explicit opportunities to learn these problem-solving practices. These activities have been implemented in different science and engineering courses. For Inclusive science and engineering, she examines different barriers for equity in STEM education and through what instructional and/or institutional changes they can be addressed. Her recent works focus on what are the underlying mechanisms for demographic performance gaps in STEM college education, and what instructional practices better serve students from different demographic backgrounds. Salehi holds a PhD in Learning Sciences and a PhD minor in Psychology from Stanford University, and received a B.Sc. degree in Electrical Engineering from Sharif University of Technology, Iran. She is the founder of KhanAcademyFarsi, a non-profit educational organization which has provided service to Farsi-speaking students, particularly in under-privileged areas.

### ACADEMIC APPOINTMENTS

- Assistant Professor-Research, Graduate School of Education
- Member, Wu Tsai Human Performance Alliance

## Research & Scholarship

### RESEARCH INTERESTS

- Artificial intelligence (AI)
- Assessment & Evaluation
- Cognitive Development
- Collaborative Learning
- Community-Engaged Research
- Culturally Responsive Pedagogies

- Data Science Education
- Educational Inequality
- Higher Education
- Human-Computer Interaction
- Learning Sciences
- Learning Technologies
- Measurement in Education
- Postsecondary Access
- Quantitative Methods
- Race, Culture, and Identity
- STEM Education
- Science Education
- Social Psychology
- Teacher Professional Development

## Teaching

### COURSES

**2026-27**

- Learning & Teaching of Science: CTL 280, EDUC 280, ENGR 295, PHYSICS 295 (Spr)

**2025-26**

- Learning & Teaching of Science: CTL 280, EDUC 280, ENGR 295, PHYSICS 295 (Spr)

### STANFORD ADVISEES

**Doctoral Dissertation Advisor (AC)**

Josh Arens, Alessandra Napoli

**Doctoral Dissertation Co-Advisor (AC)**

Angel Rivera

**Master's Program Advisor**

Tianze Shao

**Doctoral (Program)**

Ramya Kumar, Angel Rivera

## Publications

### PUBLICATIONS

- **Development and Implementation of an AI Tutor To Scaffold Problem-Solving in Introductory Chemistry** *JOURNAL OF CHEMICAL EDUCATION*
  Wang, K. D., Arens, J. T., Yu, C., Smith, J. N., Bartels, H., Haub, M., Fung, F., Haber, N., Salehi, S., Poehlmann, J.
  2026
- **How tutors scaffold learning during puzzle game play** *ETR&D-EDUCATIONAL TECHNOLOGY RESEARCH AND DEVELOPMENT*
  Anderson, C. G., Carpenter, Z., Hussein, B., Salehi, S., DeLiema, D.

2026

- **Scaffold or Crutch? Examining College Students' Use and Views of Generative AI Tools for STEM Education**
  Wang, K. D., Wu, Z., Tufts, L., Wieman, C., Salehi, S., Haber, N., IEEE
  IEEE.2025
- **WIP: Designing content-relevant interventions to promote academic resilience in an engineering project course**
  Napoli, A. O., Venook, R., Salehi, S., IEEE COMPUTER SOC
  IEEE COMPUTER SOC.2025
- **WIP: Diary of an Engineer: Using project notebooks as a formative assessment in project-based courses**
  Napoli, A. O., Tufts, L., Venook, R., Salehi, S., IEEE COMPUTER SOC
  IEEE COMPUTER SOC.2025
- **Exploring Differences in Clinical Decisions Between Medical Students and Expert Clinicians.** *Advances in medical education and practice*
  Rojas, M., Price, A., Kim, C. J., Chen, S. F., Gutierrez, K., Wieman, C., Salehi, S.
  2024; 15: 1285-1297
- **Employing technology-enhanced feedback and scaffolding to support the development of deep science understanding using computer simulations** *INTERNATIONAL JOURNAL OF STEM EDUCATION*
  Kaldaras, L., Wang, K. D., Nardo, J. E., Price, A., Perkins, K., Wieman, C., Salehi, S.
  2024; 11 (1)
- **Exploring the Performance of ChatGPT Versions 3.5, 4, and 4 With Vision in the Chilean Medical Licensing Examination: Observational Study.** *JMIR medical education*
  Rojas, M., Rojas, M., Burgess, V., Toro-Pérez, J., Salehi, S.
  2024; 10: e55048
- **Examining the potential and pitfalls of ChatGPT in science and engineering problem-solving** *FRONTIERS IN EDUCATION*
  Wang, K. D., Burkholder, E., Wieman, C., Salehi, S., Haber, N.
  2024; 8
- **Introducing the Problem-Solving Template as a Tool for Equity: Addressing Incoming Preparation Disparities** *J. Chem. Educ.*
  Schwartz Poehlmann, J. K., Nardo, J. E., Rojas, M., Salehi, S.
  2024; 101 (3): 1332–1340
- **Discovering Players' Problem-Solving Behavioral Characteristics in a Puzzle Game through Sequence Mining**
  Wang, K. D., Liu, H., DeLiema, D., Haber, N., Salehi, S., Assoc Computing Machinery
  ASSOC COMPUTING MACHINERY.2024: 498-506
- **The STEMentors Program: Promoting the Academic Readiness and Community Building of Students within General Chemistry** *JOURNAL OF CHEMICAL EDUCATION*
  Deweese, D., Nardo, J., Applebaum, I., Sundrani, S., Zur, A., Waymouth, R. M., Poehlmann, J., Salehi, S.
  2023; 101 (1): 88-96
- **Global perspectives of the impact of the COVID-19 pandemic on learning science in higher education.** *PloS one*
  Salehi, S., Ballen, C. J., Bolander Laksov, K., Ismayilova, K., Poronnik, P., Ross, P. M., Tzioumis, V., Wieman, C.
  2023; 18 (12): e0294821
- **Pathways of opportunity in STEM: comparative investigation of degree attainment across different demographic groups at a large research institution** *INTERNATIONAL JOURNAL OF STEM EDUCATION*
  Costello, R. A., Salehi, S., Ballen, C. J., Burkholder, E.
  2023; 10 (1)
- **Effects of the COVID-19 pandemic on academic preparation and performance: a complex picture of equity** *FRONTIERS IN EDUCATION*
  Burkholder, E. W., Salehi, S.
  2023; 8
- **Impact of Prompting Engineering Undergraduates to Reflect on Their Problem-Solving Skills** *INTERNATIONAL JOURNAL OF ENGINEERING EDUCATION*
  Salehi, S., Wang, K. D., Flynn, M., Wieman, C.

2023; 39 (2): 653-667

- **A systematic review of the 60 year literature: Effects of outreach programs in supporting historically marginalized and first-generation, low-income students in healthcare education.** *PloS one*
  Jenkins, E., Nardo, J. E., Salehi, S.
  2022; 17 (12): e0278453
- **Differential Impact of the COVID-19 Pandemic on Female Graduate Students and Postdocs in the Chemical Sciences.** *Journal of chemical education*
  Sifri, R. J., McLoughlin, E. A., Fors, B. P., Salehi, S.
  2022; 99 (10): 3461-3470
- **Equitable approach to introductory calculus-based physics courses focused on problem solving** *PHYSICAL REVIEW PHYSICS EDUCATION RESEARCH*
  Burkholder, E., Salehi, S., Sackeyfio, S., Mohamed-Hinds, N., Wieman, C.
  2022; 18 (2)
- **Differential Impact of the COVID-19 Pandemic on Female Graduate Students and Postdocs in the Chemical Sciences** *JOURNAL OF CHEMICAL EDUCATION*
  Sifri, R. J., McLoughlin, E. A., Fors, B. P., Salehi, S.
  2022
- **An accurate and practical method for assessing science and engineering problem-solving expertise** *INTERNATIONAL JOURNAL OF SCIENCE EDUCATION*
  Price, A., Salehi, S., Burkholder, E., Kim, C., Isava, V., Flynn, M., Wieman, C.
  2022
- **Perspectives on Active Learning: Challenges for Equitable Active Learning Implementation br** *JOURNAL OF CHEMICAL EDUCATION*
  Nardo, J., Chapman, N. C., Shi, E., Wieman, C., Salehi, S.
  2022; 99 (4): 1691-1699
- **Perspectives on Active Learning: Challenges for Equitable Active Learning Implementation** *JOURNAL OF CHEMICAL EDUCATION*
  Nardo, J., Chapman, N. C., Shi, E., Wieman, C., Salehi, S.
  2022
- **Exploring the pre-instruction gender gap in physics.** *PloS one*
  Burkholder, E., Salehi, S.
  2022; 17 (7): e0271184
- **Inclusive Instructional Practices: Course Design, Implementation, and Discourse** *FRONTIERS IN EDUCATION*
  Salehi, S., Ballen, C. J., Trujillo, G., Wieman, C.
  2021; 6
- **Mixed results from a multiple regression analysis of supplemental instruction courses in introductory physics.** *PloS one*
  Burkholder, E., Salehi, S., Wieman, C. E.
  2021; 16 (4): e0249086
- **Mediation Analysis in Discipline-Based Education Research Using Structural Equation Modeling: Beyond "What Works" to Understand How It Works, and for Whom.** *Journal of microbiology & biology education*
  Ballen, C. J., Salehi, S.
  2021; 22 (2)
- **Variation in Incoming Academic Preparation: Consequences for Minority and First-Generation Students** *FRONTIERS IN EDUCATION*
  Salehi, S., Cotner, S., Ballen, C. J.
  2020; 5
- **Variation in Incoming Academic Preparation: Consequences for Minority and First-Generation Students** *Front. Educ.*
  Salehi, S., Cotner, S., Ballen, C. J.
  2020; 5 (552364)
- **Can Majoring in Computer Science Improve General Problem-solving Skills?** *SIGCSE '20: Proceedings of the 51st ACM Technical Symposium on Computer Science Education*

Salehi, S., Wang, K. D., Toorawa, R., Wieman, C.
2020: 156–161

- **Demographic gaps or preparation gaps?: The large impact of incoming preparation on performance of students in introductory physics** *PHYSICAL REVIEW PHYSICS EDUCATION RESEARCH*
  Salehi, S., Burkholder, E., Lepage, G., Pollock, S., Wieman, C.
  2019; 15 (2)
- **Exploring bias in mechanical engineering students' perceptions of classmates.** *PloS one*
  Salehi, S., Holmes, N. G., Wieman, C.
  2019; 14 (3): e0212477
- **The impact of incoming preparation and demographics on performance in Physics I: a multi-institution comparison** *arXiv:1905.00389 [physics.ed-ph]*
  Salehi, S., Burkholder, E., LePage, P. G., Pollock, S., Wieman, C.
  2019
- **Tools for Science Inquiry Learning: Tool Affordances, Experimentation Strategies, and Conceptual Understanding** *JOURNAL OF SCIENCE EDUCATION AND TECHNOLOGY*
  Bumbacher, E., Salehi, S., Wieman, C., Blikstein, P.
  2018; 27 (3): 215–35
- **Enhancing Diversity in Undergraduate Science: Self-Efficacy Drives Performance Gains with Active Learning** *CBE-LIFE SCIENCES EDUCATION*
  Ballen, C. J., Wieman, C., Salehi, S., Searle, J. B., Zamudio, K. R.
  2017; 16 (4)
- **Exams disadvantage women in introductory biology** *PLOS ONE*
  Ballen, C. J., Salehi, S., Cotner, S.
  2017; 12 (10): e0186419
- **Enhancing Diversity in Undergraduate Science: Self-Efficacy Drives Performance Gains with Active Learning.** *CBE life sciences education*
  Ballen, C. J., Wieman, C., Salehi, S., Searle, J. B., Zamudio, K. R.
  2017; 16 (4)