

Safaa Y. El-Mansy

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Professional Profile

TEACHING – FOCUSED CHEMISTRY EDUCATION RESEARCHER

- Ph.D. in Chemistry (Chemistry Education Research) with expertise in physical chemistry and spectroscopy
- Extensive experience teaching General Chemistry and Physical Chemistry (Thermodynamics, Quantum Mechanics, Spectroscopy) at liberal arts and research universities
- Student – centered pedagogical practices including active learning, guided inquiry, and polling technologies in lecture and laboratory settings
- Committed to inclusive, collaborative teaching environments
 - Mastery and specifications grading to promote equity and persistence

Education

PH.D. CHEMISTRY | PORTLAND STATE UNIVERSITY | 2023

- Advisor: Dr. Jack Barbera
- Dissertation: Cognitive Engagement in Group Learning Activities: An Analysis of Student Discourse

M.S. MATERIALS SCIENCE AND ENGINEERING | STANFORD UNIVERSITY | 1997

B.S. WITH HONORS CHEMISTRY | PORTLAND STATE UNIVERSITY | 1995

Teaching Experience

VISITING ASSISTANT PROFESSOR | REED COLLEGE | 2024 - PRESENT

- Physical Chemistry Lecture: Quantum Mechanics and Molecular Structure (CHEM 333) Fall 2025
 - Designed and implemented guided inquiry activities using collaborative group work
 - Implemented specifications – based grading system with multiple re – assessment opportunities
- Physical Chemistry Lab: Diatomic spectra (CHEM 316) Fall 2024, Fall 2025
 - Applied guided inquiry lab format to teach the application of quantum concepts to spectroscopy
- Introductory Chemistry Lecture (CHEM 102) Spring 2024, Spring 2025, Spring 2026
 - Implemented in – class polling questions and guided – inquiry worksheets
 - Developed new mastery – based grading system
- Introductory Chemistry Labs (CHEM 101 and 102) Spring 2024 and Fall 2024

GRADUATE LECTURER | PORTLAND STATE UNIVERSITY | 2023

- Instructor of record for Physical Chemistry I: Thermodynamics (CHEM 440) Fall 2023
 - Developed syllabus and curriculum
 - Created course content and assessments
 - Designed and implemented active learning worksheets related to these concepts
 - Facilitated small group discussions around these worksheets

CO – INSTRUCTOR | PORTLAND STATE UNIVERSITY | 2023

- Physical Chemistry III: Quantum/Spectroscopy (CHEM 442) Spring 2023
 - Instructed students on concepts related to the Hydrogen Atom and Harmonic Oscillator models of quantum mechanics
 - Designed and implemented active learning worksheets related to these concepts
 - Facilitated small group discussions around these worksheets

GRADUATE TEACHING ASSISTANT | PORTLAND STATE UNIVERSITY | 2019 - 2022

- Introductory Chemistry, General Chemistry (I, II, and III), Quantitative Analysis, Physical Chemistry, and Materials Chemistry laboratories
 - Responsibilities included instructing, grading, supervising students, holding weekly office hours and answering questions
 - Gained hands-on experience with UV-Vis and FT-IR spectroscopy and bomb calorimetry
 - Designed virtual bomb calorimetry lab using BeyondLabz simulation software
 - Designed a new grading rubric for the Physical Chemistry laboratory

INSTRUCTOR | SATURDAY ACADEMY | 2014 - 2018

- Taught chemistry, physics, and engineering classes for students in grades 2-12
 - Developed and prepared curriculum for various age groups, including multiple unique hands-on experiments

Research and Scholarship

GRADUATE RESEARCH ASSISTANT | PORTLAND STATE UNIVERSITY | 2019 - 2023

- Conducted qualitative data collection for NSF funded project investigating student discourse in group activities in General Chemistry classes
- Utilized qualitative methods to conduct semi-structured interviews
- Gained experience with qualitative data analysis techniques
- Developed and implemented new activities for General Chemistry and Physical Chemistry courses based on research findings

RESEARCH AREAS

- Cognitive engagement in small – group learning in chemistry courses
- Math as a barrier to success in physical chemistry
- Use of artificial intelligence and large – language models to support chemistry learning

Industry Experience

MATERIALS LAB ENGINEER | INTEL CORPORATION | 1997 - 2006

- Member of Components Technology Development Quality and Reliability Group
 - Integral member of starting up thermal mechanical measurement capabilities to thin film integrated circuits
 - Developed novel four-point bending testing tool to measure delamination strength of interfacial films

- Used analytical tools such as FT-IR and thermal desorption spectroscopy (TDS) to correlate thin film mechanical properties to interfacial chemistry

Publications, Presentations, and Workshops

- El-Mansy, S.Y.**, Ahuja, S., Cass, D. (2026, July). *Shifting the Focus from Points to Proficiency: A Three-Year Evolution of Alternative Grading in General Chemistry*. [Presentation]. In Marwa Abdel Latif, Mara Livezey, Danielle Maxwell, Matt Mio (Organizers), *Pathways to Engaging in Research and Practice with Alternative Grading Systems*. Symposium conducted at the Biennial Conference on Chemical Education (BCCE). Madison, WI.
- El-Mansy, S.Y.** (2026, July). *Demystifying the Quantum: Implementing Specifications Grading to Align Assessment with Mastery in Physical Chemistry*. [Distillation]. In Craig Teague, David Gardner, Grace Stokes (Organizers), *Engaging Students in Physical Chemistry*. Symposium conducted at the Biennial Conference on Chemical Education (BCCE). Madison, WI.
- El-Mansy, S. Y.** (invited departmental seminar, 2024, October). *Cognitive Engagement in Group Learning Activities: An Analysis of Student Discourse*. Portland State University Physics.
- El-Mansy, S. Y.**, Barbera, J., & Hartig, A. J. (2024, July). *Beyond verbatim transcription: Using techniques from applied linguistics to enhance the analysis of classroom talk in chemistry education research*. [Workshop]. Conducted at the Biennial Conference on Chemical Education (BCCE). Lexington, KY.
- El-Mansy, S. Y.**, Stephens A., Mortensen A., Francis J. M., Feldman S., Sahnnow C. A., et al., (2024), Factors affecting individuals' cognitive engagement during group work in general chemistry: timing, group size, and question type. *Chem. Educ. Res. Pract.*, 25(3), 799–814, <https://doi.org/10.1039/D3RP00279A>
- El-Mansy, S.Y.**, Barbera, J., & Hartig, A.J. (2023, July). *What affects a student's engagement when participating small group work in a General Chemistry class?* [Poster]. Chemistry Education Research and Practice Gordon Research Conference (CERP GRC). Lewiston, ME.
- Hartig, A.J, **El-Mansy, S.Y.**, Mortensen, A., Francis, J.M., & Barbera, J. (2023, March). *Understanding Engagement in Active Learning in STEM through Conversation Analysis*. [Presentation]. In *Educational Linguistics*. Symposium conducted at the American Association for Applied Linguistics Conference (AAAL). Portland, OR.
- El-Mansy, S.Y.**, Barbera, J., & Hartig, A.J. (2022, August). *Cognitive Engagement in Small-Group General Chemistry Activities: Application of Qualitative Content Analysis and the ICAP Framework to Group Conversations*. [Presentation]. In Olivia Crandell, Megan Connor (Organizers), *Chemistry Education Research: Graduate Student Research*. Symposium conducted at the Biennial Conference on Chemical Education (BCCE). West Lafayette, IN.
- El-Mansy, S.Y.**, Barbera, J., & Hartig, A.J. (2022, May). *Examining Cognitive Engagement in Group Activities through three lenses*. [Poster]. Methods in Chemistry Education Research (virtual).

- El-Mansy, S. Y.**, Barbera, J., & Hartig, A. J. (2021). Investigating small-group cognitive engagement in general chemistry learning activities using qualitative content analysis and the ICAP framework. *Chemistry Education Research and Practice*. <https://doi.org/10.1039/d1rp00276g>
- Andideh, E., Lerner, M., Palmrose, G., **El-Mansy, S.**, Scherban, T., Xu, G., & Blaine, J. (2004). Compositional effects on electrical and mechanical properties in carbon-doped oxide dielectric films: Application of Fourier-transform infrared spectroscopy. *Journal of Vacuum Science & Technology B: Microelectronics and Nanometer Structures*, 22(1), 196–201. <https://doi.org/10.1116/1.1640401>
- Scherban, T., Pantuso, D., Sun, B., **El-Mansy, S.**, Xu, J., Elizalde, M. R., Sánchez, J. M., & Martínez-Esnaola, J. M. (2003). Characterization of interconnect interfacial adhesion by cross-sectional nanoindentation. *International Journal of Fracture*, 120(1–2), 421–429. <https://doi.org/10.1023/a:1024931913643>
- Ma, Q., Tran, Q., Sun, B., **El-Mansy, S.**, Sun, J., & Fujimoto, H. (1999). Measurement of Toughness for Sin Films on Silicon Using Channel Cracking Technique. *MRS Proceedings*, 563, 285. <https://doi.org/10.1557/PROC-563-285>
- Sánchez, J. M., **El-Mansy, S.**, Sun, B., Scherban, T., Fang, N., Pantuso, D., ... Maiz, J. (1999). Cross-sectional nanoindentation: a new technique for thin film interfacial adhesion characterization. *Acta Materialia*, 47(17), 4405–4413. [https://doi.org/10.1016/S1359-6454\(99\)00254-2](https://doi.org/10.1016/S1359-6454(99)00254-2)
- Ma, Q., Xie, J., Chao, S., **El-Mansy, S.**, Mcfadden, R., & Fujimoto, H. (1998). Channel Cracking Technique for Toughness Measurement of Brittle Dielectric Thin Films on Silicon Substrates. *MRS Proceedings*, 516, 331. <https://doi.org/10.1557/PROC-516-331>

Awards Received

INTEL CORPORATION

1998

- Achievement Award for development and characterization of novel interlayer dielectric film for semiconductor processing

PORTLAND STATE UNIVERSITY

- Paul Emmett Award for Outstanding Graduate Student 2023
- Chemistry Department Graduate Student Travel Award 2023
- Outstanding Senior in Chemistry Award 1995
- Golden Key National Honors Society 1995
- Clyde Johnson Award to an outstanding junior in chemistry 1994
- Dean's list 1991 – 1995
- Presidential Scholarship 1991 – 1995

Service & Outreach

REED COLLEGE

- Co – Organizer of ACS Women in Science Elaine Nam Memorial Symposium 2025
- ACS student section co-mentor & student life liaison 2024 – PRESENT
- Reviewer 2024 – PRESENT

- *Five manuscripts for Journal of Chemical Education*
- *Three manuscripts for Chemistry Education Research and Practice*
- *One manuscript for CBE – Life Sciences Education*
- *One manuscript for Qeios*

PORTLAND STATE UNIVERSITY

- *Graduate Student Seminar Committee* **2022**
 - *Invited and hosted Dr. Renee Cole for chemistry department's seminar series*
- *Oregon Health Sciences University (OHSU) On Track! Program* **2020**
 - *Taught general chemistry laboratories to high school students from marginalized groups*