

Lamyaa M. Almeahmadi, Ms., PhD

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EDUCATION

University at Albany, State University of New York

Ph.D. in Chemistry

August 2019 - August 2023

Dissertation: *Enhanced Raman Spectroscopy Techniques for Drug Discovery, mRNA Vaccine Stability Assessment, and Forensic Applications*

Committee: Igor K. Lednev (Advisor), Alexander Shekhtman, Mehmet Yigit, and Jia Sheng.

GPA: 4.0/4.0

University at Albany, State University of New York

Master of Science in Chemistry

August 2018 - June 2019

Thesis: *SERS for Protein Detection at a Single-Molecule Level for Developing a New Medical Diagnostics Platform*

University at Albany, State University of New York

Bachelor in Chemistry with Emphasis on Chemical Biology

August 2014 - June 2018

PUBLICATIONS

- (1) *Invited Almeahmadi, L.M.* and Igor K. Lednev, "Surface-enhanced Raman Spectroscopy (SERS) at the Interface between Drug Discovery and Personalized Medicine" JPC special issue **(Accepted for Journal Cover)**
- (2) **Almeahmadi, L. M.**; Reverdatto, S. V.; Ermolenkov, V. V.; Shekhtman, A.; Lednev, I. K. In Situ Stability Test for mRNA Vaccines Based on Deep-UV Resonance Raman Spectroscopy. *Analytical Chemistry* 2023. DOI: <https://pubs.acs.org/doi/10.1021/acs.analchem.3c01761> (in-press) **(Accepted for Journal Cover)**
- (3) **Almeahmadi, L.M.**, and Lednev, I.K. Stand-off Raman spectroscopy is a promising approach for the detection and identification of bloodstains for forensic purposes, *J Raman Spectrosc* 2023, 1. <https://doi.org/10.1002/jrs.6609>
- (4) **Almeahmadi, L.M.**, Valsangkar, V.A., Halvorsen, K., Zhang, Q., Jia Sheng, and Igor K. Lednev Surface-enhanced Raman Spectroscopy for Drug Discovery: Peptide-RNA binding. *Analytical and Bioanalytical Chemistry* (2022) doi: <https://doi.org/10.1007/s00216-022-04190-5>
- (5) **Almeahmadi, L.M.**, Curley, S.M., Tokranova, N.A. Scott A. Tenenbaum, and Igor K. Lednev Surface Enhanced Raman Spectroscopy for Single Molecule Protein Detection. *Sci Rep* 9, 12356 (2019). <https://doi.org/10.1038/s41598-019-48650-y>
- (6) Matroodi, F., Rajnovic, D., Marcello, A., **Almeahmadi, L.M.**, Masciovecchio, C., Rossi, B., and Lednev, I.K. Deep-UV Resonance Raman spectroscopy for virus particle analysis (*In preparation*)

U.S. PATENT

- (1) *Submitted for patent Stand-off Raman Spectroscopy for Body Fluids Analysis*
Almeahmadi, L.M., Lednev, I. K. <https://patents.google.com/patent/US20240053200A1/en>
- (2) *Submitted for US and International application patent Raman Spectroscopy for Testing Stability of RNA-based Vaccines and Drugs*
Lednev, I. K., Shekhtman, A., **Almeahmadi, L. M.**, Reverdatto, S. V.
- (3) *Submitted for Provisional patent Spectroscopic Platform for Drug Discovery: Peptide-RNA Binding*
Lednev, I. K., **Almeahmadi, L. M.**, Sheng, J.

RESEARCH EXPERIENCE

- September 2023- Present **Post-doctoral Fellow, Massachusetts Institute of Technology (MIT)**
The Photonic Materials Group, Juejun Hu Laboratory
- December 2022- August 2023 **Research Project Assistant**, Chemistry Department, Lednev Laboratory, University at Albany, State University of New York
- August 2019— January 2020 **Research Project Assistant**, Chemistry Department, Lednev Laboratory, University at Albany, State University of New York
- January 2018— August 2023 **Graduate Student Researcher**, Chemistry Department, Lednev Laboratory, University at Albany, State University of New York
- January 2016— May 2016 **Undergraduate Student Researcher**, Chemistry Department, Gerd-Uwe Flechsig, University at Albany, State University of New York

TEACHING EXPERIENCE

- Fall 2021 **Lecturer (Instructor of Record)**, Chemistry Department, University at Albany, State University of New York
General Chemistry Engagement, 1 section, 15 students
- Spring 2019 **Lecturer (Instructor of Record)**, Chemistry Department, University at Albany, State University of New York
General Chemistry, 2 sections, 44 students.
Problem Solving General Chemistry, 2 sections, 44 students

CONFERENCES PRESENTATIONS

Oral Presentations

- *Invited*, **Almehmadi, L.M.** “Drug Discovery-enabled Surface-enhanced Raman spectroscopy (SERS) platform: Hit Identification”, Rising Stars in Analytical Chemistry session, American Chemical Society Fall 2024 (upcoming)
- **Almehmadi, L.M.** “Enhanced Raman Spectroscopy Techniques for Drug Discovery, mRNA vaccine Stability and Forensics”, 2023 Rising Stars in Analytical Chemistry Celebration, Virtual, May 2023
- **Almehmadi, L.M.** and Igor K. Lednev “Enhanced Raman Spectroscopy: Single-molecule, Drug Discovery, and Forensics”, Southeastern Regional Meeting of the American Chemical Society 2022, San Juan, Puerto Rico, October 2022
- *Invited* **Almehmadi, L.M.**, Vibhav A. Valsangkar, Ken Halvorsen, Qiang Zhang, Jia Sheng, and Igor K. Lednev “Label-free SERS for Drug Discovery: Hit Identification”, SciX 2022, Cincinnati, Kentucky, October 2022
- **Almehmadi, L.M.**, Vibhav A. Valsangkar, Ken Halvorsen, Qiang Zhang, Jia Sheng, and Igor K. Lednev “SERS, a Single-molecule and Label-free Technique for Drug Discovery”, ICORS 2022, Long Beach, California, August 2022
- **Almehmadi, L.M.**, Vibhav A. Valsangkar, Ken Halvorsen, Qiang Zhang, Jia Sheng, and Igor K. Lednev “SERS, a novel technique for Drug Discovery”, The First Annual New York Capital Region Applied Spectroscopy Symposium, Albany, NY, May 2022
- **Almehmadi, L.M.**, Vibhav A. Valsangkar, Ken Halvorsen, Qiang Zhang, Jia Sheng, and Igor K. Lednev “SERS, a Single-molecule and Label-free Technique for Drug Discovery”, 8th Annual RNA Institute Symposium, Albany, NY, March 2022
- **Almehmadi, L.M.**, Vibhav A. Valsangkar, Ken Halvorsen, Qiang Zhang, Jia Sheng, and Igor K. Lednev “Surface-enhanced Raman Spectroscopy, a Sensitive and Label-free Technique for Drug Discovery: Ligand and RNA Specific Binding”, SciX 2021, Providence, RI, September 2021

- **Invited Almehmadi, L.M.**, Curley, S.M., Tokranova, N.A. Scott A. Tenenbaum, and Igor K. Lednev “SERS for Single-molecule Detection, a Tool for Developing New Technologies”, NY/NJ SAS Regional Meeting July 2021
- **Almehmadi, L.M.**, Curley, S.M., Tokranova, N.A. Scott A. Tenenbaum, and Igor K. Lednev “Investigation of SERS Potential to Detect Proteins within Adducts at an Ultralow Concentration”, 35th International Symposium on Microscale Separations and Bioanalysis (MSB), Corvallis, OR, March 2019

Poster Presentations

- **Almehmadi, L.M.**, Reverdatto, S.V., Ermolenkov V.V., Shekhtman, A., and Lednev, I.K. “Directly Detecting mRNA Degradation in mRNA Vaccine Model using Deep-UV Resonance Raman Spectroscopy”, The Second Annual New York Capital Region Applied Spectroscopy Symposium, Albany, NY, June 2023
- **Almehmadi, L.M.**, and Igor K. Lednev “Stand-off Raman Spectroscopy: A Novel Method for the Detection and Identification of Body Fluid Traces”, The Second Annual New York Capital Region Applied Spectroscopy Symposium, Albany, NY, June 2023
- **Almehmadi, L.M.**, Reverdatto, S.V., Ermolenkov V.V., Shekhtman, A., and Lednev, I.K. “Directly Detecting mRNA Degradation in mRNA Vaccine Model using Deep-UV Resonance Raman Spectroscopy”, 9th Annual RNA Institute Symposium, Albany, NY, March 2023
- **Almehmadi, L.M.**, and Igor K. Lednev “Stand-off Raman Spectroscopy: A Novel Method for the Detection and Identification of Body Fluid Traces”, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (PITTCON) Philadelphia, PA, March 2023
- **Almehmadi, L.M.**, and Igor K. Lednev “Stand-off Raman Spectroscopy: A Novel Method for the Detection and Identification of Body Fluid Traces”, SciX 2022, Cincinnati, Kentucky, October 2022
- **Almehmadi, L.M.**, Vibhav A. Valsangkar, Ken Halvorsen, Qiang Zhang, Jia Sheng, and Igor K. Lednev “Surface-enhanced Raman Spectroscopy, a Sensitive and Label-free Technique for Drug Discovery: Ligand and RNA Specific Binding”, Life Sciences Research Symposium at University at Albany, Albany, NY, January 2022
- **Almehmadi, L.M.**, Curley, S.M., Tokranova, N.A. Scott A. Tenenbaum, and Igor K. Lednev, “Using SERS for Protein-Small Molecule Detection on a Single-Molecule Level”, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (PITTCON) Philadelphia, PA, March 2019
- **Almehmadi, L.M.**, Curley, S.M., Tokranova, N.A. Scott A. Tenenbaum, and Igor K. Lednev “Using SERS for Protein-Small Molecule Detection on a Single-Molecule Level”, 2nd Combined Symposium (UA-CNSE) Albany, NY, April 2019
- **Almehmadi, L.M.**, Curley, S.M., Tokranova, N.A. Scott A. Tenenbaum, and Igor K. Lednev “Using SERS for Protein-Small Molecule Detection on a Single-Molecule Level”, Life Sciences Research Symposium at University at Albany, Albany, NY, 2018

AWARDS, FELLOWSHIPS AND NOMINATIONS

2024	MIT-IBK Research Award (\$30,000) , Massachusetts Institute of Technology (MIT).
2024	12th Regeneron Prize for Creative Innovation in 2024 Research proposal nominated by MIT as one of top two proposals submitted by Postdoctoral researchers from MIT
2023	MIT IBK Post-doctoral Fellowship (\$152,500) A 2-year post-doctoral award to work at MIT laboratories of the recipient's choice
2023	Society for Applied Spectroscopy Barbara Stull Graduate Student Award This award is given to graduate students with an exemplary demonstration of scientific accomplishments in the field of spectroscopy via research, publications, and presentations.
2023	Rising Star in Analytical Chemistry, Analytical Chemistry Division, American Chemical Society This award is given to talented graduate students and post-doctorates.

- 2022 **Coblentz Society Student Award**
This award is given to an outstanding student doing research in the field of spectroscopy.
- 2022 **Ford Foundation IFW Women in Science Fellowship**
- 2022 **Research and Professional Development Graduate Student Grant by the University at Albany**
- 2021 **Honorable mention for the 2021-2022 Graduate Women in Science (GWIS) National Fellowship Program**
This award is given to students who show overall excellence, scholarly achievement, and significant promise for future research.
- 2021 **Ford Foundation IFW Women in Science Fellowship**
- 2021 **Research and Professional Development Graduate Student Grant by the University at Albany**
- 2021 **Grants in Aid of Research award, Sigma Xi, The Scientific Research Honor Society**
- 2018 **Best Poster Presentation Award**
The 2018 Life Sciences Research Symposium at University at Albany. October 26th, 2018.
- 2014-2023 **Full scholarship for B.S., M.S., and Ph.D. studies from King Abdullah bin Abdul-Aziz Al Saud Scholarship program**

LEADERSHIP and OTHER ACTIVITIES

- 2024 **Member**, MIT Intellectual Property Committee.
- 2024 **2024 Chair**, Rising Talents in Enhanced Raman Spectroscopy, SciX 2024 (*upcoming*)
- 2024 **2024 Co-Chair**, Raman Spectroscopy for Security and Forensics Purposes, SciX 2024 (*upcoming*)
- 2024- current **Newsletter Science Editor**, The Coblentz Society
- 2023 **Co-Chair**, Raman Spectroscopy for Security and Forensics Purposes, Sparks, Nevada, October 2023
- 2023 **Workshop Instructor**, "Raman Spectroscopy: A Rapid Dive into Principles and Applications", New York Capital Region Student Chapter of the Society for Applied Spectroscopy, Virtual, May 2023
- 2022 **Educational Outreach Session Co-organizer**, The Forensic Investigation Center School, New York State Police and the University at Albany, SUNY, October 2022
- 2022 **Co-Chair**, SERS for Drug Discovery Session, SciX 2022, Cincinnati, Kentucky, October 2022
- 2022 **Chair**, The First Annual New York Capital Region Applied Spectroscopy Symposium, Albany, NY, May 2022
- 2022— 2023 **Lab Manager**, Lednev Laboratory
- 2021 **Organizing symposium committee member and sessions co-chair**, *Analytical and Physical Chemistry* Oral presentation sessions at the first 2021 ACS Eastern U.S. YCC Partnership Virtual Research Symposium and Chemistry Career Expo
- 2021—2023 **President**, New York Capital Region Student Chapter of the Society for Applied Spectroscopy
- 2020— 2022 **Executive Committee Member**, Younger Chemists Committee - American Chemical Society - Eastern New York Section

PROFESSIONAL MEMBERSHIP

Society for Applied Spectroscopy
SPIE
American Chemical Society
Coblentz Society
Infrared & Raman Discussion Group

Journal Reviewer

2024 Nature Communications
2024 ACS Journal of Analytical Chemistry
2023 Journal of Applied Spectroscopy
2023 Journal of Forensic Chemistry
2023 The Microchemical Journal