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# Alshymaa Ali

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**Work Address**  
Department of Chemistry  
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## RESEARCH INTERESTS

Spectrophotometric analysis  
Spectrofluorometric analysis  
High Pressure Liquid Chromatography (HPLC)  
Two-Dimensional Liquid Chromatography  
(2DLC) and 2DLC-MS  
Gas Chromatography-MS (GC-MS)

## TEACHING INTERESTS

Analytical chemistry  
Chemical separation  
Quality control

## SUMMARY OF QUALIFICATIONS

- Strong research and problem-solving skills strengthened through fourteen years of research experience in spectrophotometric, spectrofluorimetric and chromatographic analysis including method development, optimization, validation, and applications.
- Proven ability to work independently on designing and leading research projects with minimal supervision, as well as to successfully collaborate with team members in academic sectors.
- Excellent analytical laboratory skills with experience in spectrophotometry, spectrofluorimetry, chromatography and mass spectrometry including HPLC-DAD, HPLC-MS, 2DLC-DAD, 2DLC-MS, GC-MS and ICP-MS.
- Proficiency in a variety of software packages including Microsoft Office, Shimadzu, Chemstation, Chromeleon, Endnote, Graphpad Prism, GC Image LLC, Chromspec, etc.
- Recipient of several distinguished scholarships and awards including, Minia University s' Master Student Award in Egypt, Joint Supervision Scholarship at the University of Waterloo sponsored by the Egyptian government, Department of Chemistry Research Studentship, Department of Chemistry Teaching Assistantship, International Doctoral Student Award (IDSA), etc.
- Excellent writing and presentation skills as proven by written proposals, reports, scientific publications, conference presentations, Master and PhD theses.
- Exceptional organization, multi-tasking, prioritization, and self-motivation skills as while working as a master student, doctoral researcher, teaching assistant and a post doctoral fellow.
- Excellent leadership, interpersonal, and verbal communication skills strengthened through 12+ years of teaching experience and through the experience in leading research projects; recipient of the Teaching Assistant Excellence Award from University of Waterloo in 2020.

## EDUCATION

### Doctor of Philosophy in Chemistry

**Aug. 2022**

Department of Chemistry, University of Waterloo, Waterloo, Ontario

*Supervisor:* Professor Tadeusz Górecki

*Thesis:* "Advances in two-dimensional liquid chromatography"

### ***Relevant Courses***

- Academic Integrity

Grade: CR

- |  |               |
|--|---------------|
| • Speaking English for Professional Purpose          | Grade: CR     |
| • Mass Spectrometry                                  | Grade: 87/100 |
| • Introduction to Experimental Design & Chemometrics | Grade: 93/100 |
| • Separations  | Grade: AUD    |

## **Master of Pharmaceutical Science in Analytical Chemistry      2013**

Department of Analytical Chemistry, Minia University, Egypt.

*Supervisor:* Mahmoud Omar

*Thesis:* “Analytical study of certain Aminoglycosides in pure forms and in pharmaceutical preparations”

### ***Relevant Courses***

- |  |                   |
|--|-------------------|
| • Advanced Analytical Chemistry                | Grade: Excellent  |
| • Advanced Pharmaceutical Analytical Chemistry | Grade: Excellence |
| • Applied Analytical Chemistry                 | Grade: Excellence |
| • Physical Chemistry                           | Grade: Excellent  |
| • Instrumental Analysis                        | Grade: Good       |
| • Computer Science                             | Grade: Excellence |
| • Mathematics                                  | Grade: Excellence |
| • Statistics                                   | Grade: Excellence |

## **Bachelor’s Degree**

**2008**

- Bachelor ‘s degree in Pharmaceutical Sciences, excellent with Degree of Honour, Faculty of Pharmacy, Minia University, Egypt.

## **RESEARCH EXPERIENCE**

### **Postdoctoral Researcher**

Department of Chemistry, Wilfred Laurier University, Waterloo

**May. 2024 – now.**

#### ***Research Projects***

- Synthesis of some volatile selenium compounds.
- Analysis of volatile selenium compounds by GC-MS and LC-MS.
- Analysis of selenium compounds by ICP-MS.

### **Postdoctoral Researcher**

Department of Chemistry, Wilfred Laurier University, Waterloo

**Nov. 2022 - Aug. 2023**

#### ***Research Projects***

- Synthesis of some volatile selenium compounds.
- Analysis of volatile selenium compounds by GC-MS and LC-MS.

### **Doctoral Researcher**

Department of Chemistry, University of Waterloo

**Fall 2018- Aug.2022**

### ***Research Projects***

- Advanced HPLC separation techniques for the analysis of environmental pollutants and natural products.
- Advances in two-dimensional liquid chromatography (LC x LC).
- Reversed phase x Reversed phase separations with parallel gradient in the second dimension to enhance utilization of the separation space and the degree of orthogonality.
- Greening” of LC×LC separations through the replacement of standard organic modifiers in both dimensions with environmentally friendly alternatives.
- Green LC×LC-DAD and LC×LC-MS methods for analysis of natural products such as analysis of polyphenolic compounds in grape juices and wine samples.

### **Visitor International Researcher**

Department of Chemistry, University of Waterloo

May 2016- Aug. 2018

### ***Research Projects***

- Advanced HPLC separation techniques for the analysis of environmental pollutants and natural products.
- LC×LC separations using reversed phase columns in both dimensions and with parallel gradient in the second dimension to enhance utilization of the separation space and the degree of orthogonality.

### **Master’s Researcher**

Department of Analytical Chemistry, Minia University, Egypt

2009-2013

### ***Research Projects***

- Preparation of samples from pure drug, different dosage forms (tablet, capsule, ampoule, vial, syrup, ointment, cream and eye drops.) and preparation of samples from human plasma.
- Development of spectrofluorimetric method for determination of some Aminoglycosides in pure and their dosage forms via condensation reaction with ninhydrin and phenylacetaldehyde.
- Development of spectrofluorimetric method for determination of some aminoglycosides in dosage forms and human plasma through reaction with Safranin.
- Development of validated spectrophotometric methods for determination of certain aminoglycosides in pharmaceutical formulations.

## **PUBLICATIONS**

- Omar, Mahmoud A.; Nagy, Dalia M.; Hammad, Mohamed A and Alshymaa A. Aly, "Highly Sensitive Spectrofluorimetric Method for Determination of Certain Aminoglycosides in Pharmaceutical Formulations and Human Plasma", AAPS PharmSciTech., (2013)14(2),828-837.
- Omar, Mahmoud A.; Nagy, Dalia M.; Hammad, Mohamed A and Alshymaa A. Aly," Validated Spectrophotometric methods for determination of certain aminoglycosides in pharmaceutical formulations Journal of Applied Pharm. Science (2013) 3 (03),151-161
- Omar, Mahmoud A.; Nagy, Dalia M.; Hammad, Mohamed A and Alshymaa A. Aly," Development of spectrofluorimetric method for determination of certain aminoglycoside drugs in dosage forms and human plasma through condensation with ninhydrin and phenyl acetaldehyde", Spectrochim Acta A Mol Biomol Spectrosc. (2014);136PC, 1760-1766.
- A.A. Aly, T. Górecki, Green Chromatography and Related Techniques, in: J. Płotka-Wasyłka, J. Namieśnik (Eds.), Green Analytical Chemistry: Past, Present and Perspectives, Springer Singapore, Singapore, 2019, pp. 241-298. [https://doi.org/10.1007/978-981-13-9105-7\\_9](https://doi.org/10.1007/978-981-13-9105-7_9).

- A.A. Aly, T. Górecki, Green Approaches to Sample Preparation Based on Extraction Techniques., *Molecules* 25(7) (2020) 1719.
- A.A. Aly, M. Muller, A. de Villiers, B.W.J. Pirok, T. Górecki, Parallel gradients in comprehensive multidimensional liquid chromatography enhance utilization of the separation space and the degree of orthogonality when the separation mechanisms are correlated, *Journal of Chromatography A* 1628 (2020) 461452. <https://doi.org/https://doi.org/10.1016/j.chroma.2020.461452>.
- A.A. Aly, T. Górecki, M.A. Omar, Green approaches to comprehensive two-dimensional liquid chromatography (LC  $\times$  LC), *Journal of Chromatography Open* 2 (2022) 100046. <https://doi.org/https://doi.org/10.1016/j.jcoa.2022.100046>.
- A.A. Aly, T. Górecki, Green comprehensive two-dimensional liquid chromatography (LC  $\times$  LC) for the analysis of phenolic compounds in grape juices and wine, *Analytical and Bioanalytical Chemistry* (2022). <https://doi.org/10.1007/s00216-022-04241-x>.
- A.A. Aly, T. Górecki, Two-dimensional liquid chromatography with reversed phase in both dimensions: A review, *Journal of Chromatography A* 1721 (2024) 464824. <https://doi.org/https://doi.org/10.1016/j.chroma.2024.464824>

## CONFERENCE PRESENTATIONS

- **Alshymaa A. Aly**, Asal Jaberansari, Jana Farell & **Dirk Wallschläger**, “COMPREHENSIVE GAS CHROMATOGRAPHIC ANALYSIS OF VOLATILE SELENIUM SPECIES”, (Oral presentation), 65<sup>th</sup> International Conference on Analytical Sciences and Spectroscopy, July 26-28, 2023, Ottawa, ON, Canada.
- **Alshymaa A. Aly**, Tadeusz Górecki, “Development of an LCxLC system using green solvents in both dimensions”, (Oral presentation), 9th Multidimensional Chromatography Workshop, January 8 – 9, 2018, Toronto, ON.
- **Alshymaa A. Aly**, Tadeusz Górecki,” Development of LCxLC system utilizing reversed phase x reversed phase separation and parallel gradient in the second dimension”, (Oral presentation), 100th Canadian Chemistry Conference and Exhibition, May 29 – June 1, 2017, Toronto, ON.
- **Alshymaa A. Aly**, Tadeusz Górecki, “Towards simpler LCxLC: RPxRP separations with parallel gradient in the second dimension to enhance utilization of the separation space”, (a poster), 41st International Symposium on Capillary Chromatography and 14th GCxGC Symposium, May 14-19, 2017, Fort Worth (TX), USA.
- **Alshymaa A. Aly**, Omar, Mahmoud A., Nagy, Dalia M., and Hammad, Mohamed A, "Spectrofluorimetric determination of studied drugs in pure and their dosage forms via condensation reaction with ninhydrin and phenylacetaldehyde"(a poster), 32nd Conference of Pharmaceutical Sciences, Egyptian Pharmaceutical Society in Egypt, December 20-22, 2011.

## TEACHING EXPERIENCE

### *Undergraduate Teaching*

#### **Teaching Assistant in Undergraduate Courses**

**Dec. 2008- May 2013**

Department of Analytical Chemistry, Minia University, Egypt.

- Experience as a teaching assistant over 22 terms in ten undergraduate courses: Qualitative Analytical Chemistry, Quantitative Analytical Chemistry (Volumetric analysis, Instrumental analysis),

Pharmaceutical analysis and Quality Control, Water Analysis, Electrochemical Analysis, Fat Analysis, chromatographic Separation and Statistics.

- *Preparing weekly practical sessions:*
  - Preparing all required samples and chemical reagents, and testing them before the practical sessions
  - Organizing scientific materials, visual aids and presentations for these practical courses.
  - Conducting seminars and discussion groups for the undergraduate students.
- *Supervising students in the laboratory:*
  - Introduced several instrumental analytical methods, trained students on the proper use of the analytical techniques, and guided them through the analysis process.
  - Observed students' work, provided recommendations, and discussed the results of their experiments and how to interpret these results.
- *Leading tutorial sessions:*
  - Designed and ran the tutorial sessions based on questions and problems developed as applications of the material covered in the course.
  - Answered questions and helped students during weekly office hours.
  - Marked assignments, quizzes, midterm and final examinations.

### **Senior teaching Assistant in Undergraduate Courses      May 2013- May 2016**

- Supervised and trained teaching assistants on the proper use of the analytical instruments.
- Supervised teaching assistants in preparation of the required samples and chemical reagents before the practical sessions
- Ensured that equipment is functioning well for lab sessions; arranged for maintenance, storage, and inventory of laboratory equipment.
- Advised the lab manager on chemicals, materials and equipment purchases required to create or update lab experiments.
- Ensured proper storage of chemicals, including chemicals classified as irritant, toxic, flammable, combustible, corrosive and/or biohazardous.
- Assisted the lab technician with maintaining current Safety Data Sheets for department chemicals.
- Responded according to the safety data sheets in the event of a chemical spill or first aid event.
- Supervised the lab technician while collecting hazardous/biohazardous waste and disposal for undergraduate labs.
- Assisted the lab technician with upkeep of chemical date inventory.
- Ensured student chemical lockers contain all necessary equipment in good condition at the beginning of each course.
- Monitored quantities of glassware, consumables, and other equipment.
- Assisted the lab technician with preventative maintenance and repairs to complex chemical instruments.
- Provided technical support to teaching assistant, and students.
- Investigated, mediated, and escalated incidents of academic misconduct according to the undergraduate student code of conduct.
- Assisted with the development of the course load.
- Participated in departmental and faculty functions and committees.

- Troubleshooted problems with experimental results, refining unsatisfactory preparatory methods as required.
- Organized scientific materials, visual aids and presentations for practical courses.
- Conducted seminars and discussion groups for the undergraduate students.
- Observed students' work, provided recommendations, and discussed the results of their experiments and how to interpret these results.
- Designed and ran the tutorial sessions based on questions and problems developed as applications of the material covered in the course.
- Answered questions and helped students during weekly office hours.
- Marked assignments, quizzes, midterm and final examinations.

## **Teaching Assistant in Undergraduate Courses**

**Jan. 2019- Aug. 2022**

Department of Chemistry, University of Waterloo, Waterloo, Ontario.

- Experience as a teaching assistant over 8 terms in 5 undergraduate courses: Analytical Chemistry Laboratory 1, Analytical Chemistry Laboratory II, Introductory Analytical Chemistry, Multi-component analysis "INTRODUCTION TO ANALYTICAL INSTRUMENTATION", and Analytical Separations.
  - Conducted basic diagnostic procedures on teaching equipment in need of repair, for example, spectrophotometers, Spectrofluorometers, GC-MS, HPLC-DAD, HPLC-MS, pH meters, analytical balances, and SPME.
  - Supervised students, introduced several instrumental analytical methods, trained them on the proper use of the analytical techniques and guided them through the analysis process.
  - Observed students' work, provided recommendations, and discussed the results of their experiments and how to interpret these results.
  - Led tutorial sessions based on questions and problems developed as applications of the material covered in the course.
  - Marked assignments, quizzes, midterm and final examinations.

## **Guest Lecturer**

- "Instrumental Analysis" (second year Analytical Chemistry course, 200-250 students)  
Minia University, Egypt
  - Spectrophotometric analysis **Winter 2014**
- "Quantitative Analytical Chemistry" (First year chemistry course, 250-300 students)  
Minia University, Egypt
  - Volumetric Analysis **Fall 2009**

## **Lecturer in Undergraduate Courses**

**Nov. 2023 – April 2024**

- "Quality control" (fourth year Analytical Chemistry course, 200-250 students)  
Minia University, Egypt

## ***Graduate Teaching***

### **Teaching Assistant in graduate Courses**

**Dec. 2008- May 2016**

Department of Analytical Chemistry, Minia University, Egypt

- Experience as a teaching assistant over 7 terms in two graduate courses: Pharmaceutical analysis and Quality Control; and Water Analysis.
- *Preparing weekly practical sessions:*
  - Preparing all required samples and chemical reagents and testing them before the practical sessions.
  - Organizing scientific materials, visual aids and presentations for these practical courses.
- *Supervising students in the laboratory:*
  - Introduced several instrumental analytical methods, trained students on the proper use of the analytical techniques, and guided them through the analysis process.
  - Observed students' work, provided recommendations, and discussed the results of their experiments and how to interpret these results.
- *Leading tutorial sessions*
  - Designed and ran the tutorial sessions based on questions and problems developed as applications of the material covered in the course.
  - Answered questions and helped students during weekly office hours.
  - Marked assignments, quizzes, midterm and final examinations.

## ***Student Supervision Experience***

### **Mentor for graduate Research Projects**

Department of Analytical Chemistry, Minia University, Egypt

**Jan. 2012- Dec. 2015**

- Introduced graduate students to the research environment, trained them on developing, planning and performing the required experiments and data analysis.
- Trained students on the proper use of the analytical instruments and guided them through the analysis process.
- Navigated them through the process of evaluation and decision making.

## **TEACHING TRAINING**

- Teaching assistance workshop  
Department of Chemistry, University of Waterloo
- Certificate in Fundamentals of University Teaching  
Centre For Teaching Excellence (CTE), University of Waterloo
- Certificate in Getting Ready to Facilitate Online Courses  
Center For Extended Learning, University of Waterloo

**September 2018**

**October 2019-April 2020**

**August 2020**

## **TEACHING AWARDS**

- Department of Chemistry Teaching Assistant Excellence Award  
Department of Chemistry, University of Waterloo

**Fall 2020**

## **SCHOLARSHIPS AND GRANTS**

- Science Graduate Award, University of Waterloo  
CAD\$ 1125- 1500/term **Sept. 2018- Aug. 2022**
- International Doctoral Student Award (IDSA), University of Waterloo  
CAD\$ 4470- 5140 /term **Sept. 2018- Aug. 2022**
- Graduate Research Studentship, University of Waterloo  
CAD\$ 2879- 7257/term **May 2018- Aug. 2018**
- University of Waterloo Graduate Scholarship for academic progress.  
CAD\$ 500, CAD\$ 1000 and CAD\$ 750 **Winter 2020, Winter 2021, and Winter 2022**
- Teaching Assistant Excellence Award, University of Waterloo.  
CAD\$ 100 **Fall 2020**
- Egyptian government s' Joint Supervision scholarship at the University of Waterloo  
CAD\$ 80000 **May 2016- April 2018**
- Minia University s' Study Leave Award in Egypt  
EP 36000/year **May 2016- May 2021**
- Minia University s' Master Student Award in Egypt  
EP 35000/year **Sep. 2011- April 2013**
- Minia University s' Master Student Award in Egypt  
EP 15000/year **Dec. 2008- Aug. 2011**
- First-ranked undergraduate student award, Minia University, Egypt  
EP 120/year **Sep. 2005- May 2008**
- First-ranked high school student award, Minia University, Egypt  
EP 120/year **Sep. 2004- Aug. 2005**

## EXTRA-CURRICULAR ACTIVITIES

- Exam facilitator in Accessibility Centre at University of Waterloo **Fall 2019- Aug. 2022**
- Community pharmacy assistant volunteer at Saber pharmacy, Minia, Egypt. **Summer 2005**  
**Summer 2006**  
**Summer 2007**
- Community pharmacist, Saber pharmacy, Minia, Egypt. **July 2008-Aug. 2009**
- Member of the Egyptian syndicate of pharmacists. **July 2008- present**
- Member of the Minia syndicate of pharmacists. **July 2008- present**

## REFERENCES

- Tadeusz Górecki  
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- Wojciech Gabryelski  
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