



**IUP Graduate Handbook**

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*Applied and Industrial Chemistry, MS*

Madia Department of *Chemistry*

Handbook Updated [2020]

Applied and Industrial Chemistry, MS

Madia Department of Chemistry

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Program Website: <https://www.iup.edu/chemistry/grad/>

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## INTRODUCTION

*Welcome to the Madia Department of Chemistry! Congratulations on choosing IUP's Applied and Industrial Chemistry Master's in Science program. This graduate handbook will serve as a guide to the program requirements, and department policies important to obtaining a satisfying and successful graduate experience.*

### **Indiana University of Pennsylvania**

*IUP combines the academic opportunities of a large university with the highly personalized and intimate learning-centered environment of a small college.*

*Almost 13,000 undergraduate and graduate students are enrolled in our accredited and nationally recognized programs, enjoying traditional and nontraditional classroom experiences, engaging in research and service activities with their faculty mentors, becoming lifelong learners, preparing for rewarding careers and productive lives, and developing leadership skills for effective citizenship.*

### **IUP's Civility Statement**

As a university of different peoples and perspectives, IUP aspires to promote the growth of all people in their academic, professional, social, and personal lives. Students, faculty, and staff join together to create a community where people exchange ideas, listen to one another with consideration and respect, and are committed to fostering civility through university structures, policies, and procedures. We, as members of the university, strive to achieve the following individual commitments:

**To strengthen the university for academic success**, I will act honestly, take responsibility for my behavior and continuous learning, and respect the freedom of others to express their views.

**To foster an environment for personal growth**, I will honor and take care of my body, mind, and character. I will be helpful to others and respect their rights. I will discourage intolerance, hatred, and injustice, and promote constructive resolution of conflict.

**To contribute to the future**, I will strive for the betterment of the community; myself, my university, the nation, and the world.

### **Affirmative Action**

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

### **Title IX Reporting Requirement**

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

### **Student Conduct and Student Rights**

[www.iup.edu/studentconduct/policies/](http://www.iup.edu/studentconduct/policies/)

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

## Madia Department of Chemistry

*The Department of Chemistry consists of 16 research-active faculty and three support staff. Five different Bachelor's degrees, including the American Chemical Society accredited Bachelor of Science in Chemistry, are offered in addition to the Master in Science degree.*

*The Master's in Science degree is for the student interested in broadening their skills in chemistry and adding a professional component from Business. IUP is one of the few programs in the nation to provide a chemistry oriented professional master program for those students who intend to go into law, government, policy, management, journalism, or industrial careers which require an advanced understanding of chemical principles. The program is designed to provide students with the background and skills to advance their career along with an internship experience in their area of interest. The internship experience will not only provide an atmosphere for students to grow by utilizing their skills but will also provide potential employers the opportunity to assess a student's capability. Our program is also designed to provide a rich and fulfilling laboratory-based project as students work one on one with a member of our faculty members.*

*Chemistry department faculty are here to guide you. We will treat you professionally and expect the same in return. Verbal abuse, hostile and threatening actions, and physical violence are not tolerated at IUP. The advisor-advisee relationship is built on trust and anything that breaks that trust will damage the relationship. You should report to the School of Graduate Studies and Research any behavior that you feel is inappropriate.*

## Mission Statement and Program Objectives

*The Master's in Science degree is for the student interesting in broadening their skills in chemistry and adding a professional component from Business. The program is designed to provide students with the background and skills to advance their career within a chemistry related industry.*

*The MS in Applied and Industrial Chemistry requires 30 credits hours of course work. Included in this total is 4 hours of internship. The student may also choose to do 6 credit hours of lab research with a chemistry faculty member.*

*A normal fulltime load in the MS program is 9 credits, therefore it would take four semesters, with the 4<sup>th</sup> semester being primarily the internship experience. Students should note that during summer semester, only CHEM 690 (Research), CHEM 799 (Internship) and a small number of business courses will be available, so most students require two school years to graduate.*

*Students who can work full time on their graduate studies can graduate in a calendar year, by taking 10-12 or more credits during Fall and Spring semester, and then doing research (CHEM 690) and internship (CHEM 799) during the summer semester.*

**Early Admission / 4+1 Timeline.** *Students can enter into Graduate studies early while still working on your undergraduate degree. With early admission in junior year:*

- *Twelve graduate credits taken in your senior year will count toward both graduate and undergraduate degrees.*
- *Take an additional 18 credits in your fifth year for the master's program.*

## Faculty and Staff

**Dr. Colin Ashe.** *Conceptual Learning in Chemistry, Use of Computer Simulations to Promote Conceptual Learning, Research-Based Curriculum Design, Optimal Modes of Student Interaction with Simulations, Use of Simulation-Based Games for Informal Learning, High-Leverage Points of Connection between Chemistry and Other Science and Engineering Disciplines, Metacognitive Strategies and Strategies for Increasing Student Motivation*

**Dr. Tim Chung.** *My lab is interested in the interaction between sun-light (UV) and organic molecules. Specifically, we are interested in using photochemistry of organic molecules in the solid state to break and form distinct bonds. Through rational design of organic substrates, we are able to harness the excited energy from a photon to perform challenging transformations. These set of organic photo-reactions will have implications in green chemistry, environmentally friendly methods, high selectivity, as well as catalyst and solvent free protocols.*

**Dr. Wendy Elcesser.** *Organometallic synthesis; bonding modes of carbon dioxide in transition metal complexes; development of interactive format demonstrations and synthesis and oxidation of transition metal complexes of Mo and Cr; improvement of teaching/ learning in the classroom and of ethical practices in the sciences.*

**Dr. Justin Fair.** *Research in the Fair Laboratory focuses on two aspects of organic chemistry. First, we are looking for green and efficient ways to make carbon-carbon and carbon-nitrogen bonds. Using water as a green solvent throughout these reactions affords not only cost savings in terms of the fewer chemicals needed, but also in terms of waste.*

*Second, we are interested in looking for ways to use organolithiums to induce regioselective and/ or stereoselective synthesis by means of deprotonation or the lithium-halogen exchange.*

*We hope to show that the methodology produced in the Fair Laboratory provides clean and efficient new routes for pharmaceutically relevant compounds.*

**Dr. John Ford.** *Bioanalytical purifications and separations, particularly of proteins; the expression, purification, and characterization of recombinant proteins; chromatographic theory and the mechanism of reversed-phase liquid chromatography.*

**Dr. Avijita Jain.** *Development of electroactive and photoactive transition metal complexes with applications in photodynamic therapy and electrocatalysis. The three research projects that I am working on are:*

- *Design and development of tumor selective, peptide coupled organometallic photodynamic therapy (PDT) agents*
- *Design and development of water oxidation electrocatalysts*
- *Design and development of novel fluorescent sensors for monitoring protein phosphorylation*

**Dr. Anne Kondo.** *The effects of molecular and laser parameters on nonlinear laser-molecule interactions by solving the time-dependent Schrodinger wave equation. Such studies are of interest in many applications in laser technology, telecommunications and the optical processing of information, where one seeks to control molecular behavior using light.*

**Dr. Carl LeBlond.** *Homogeneous and heterogeneous catalysis; the study of reaction mechanisms and chemical kinetics; mathematical modeling of chemical kinetics and transport processes.*

**Dr. Charles Lake.** *X-ray diffraction*

**Dr. George Long.** *Laser spectroscopy; the use of computers in chemical education, including the development of on-line chemistry courses; Cognitive processes and Inductive teaching methods in chemical education.*

**Dr. Sudipta Majumdar.** *The goal of our research is to utilize the unique properties of proteins, peptides and DNA for developing biocatalyst and biosensor. Techniques and methods involve a variety of molecular biology and protein engineering tools, including rational, semi-rational and evolutionary approaches.*

**Dr. Sanda Andrada Maicaneanu.** *The goal of our research is to successfully use various materials for water and wastewater treatment using non-catalytic and catalytic processes.*

**Dr. Nathan McElroy.** *My current research interests at IUP deal with water quality issues, with a particular focus on the effects of Marcellus shale gas extraction in Indiana County and western Pennsylvania. Since 2011, my students and I have been involved in a water monitoring study at the Beaver Run Reservoir in Westmoreland County.*

**Dr. Ronald See.** *Our research works to understand the physical basis for the bonding and structure of a variety of chemical species. Currently, we are focusing on metal-ligand interactions in coordination and organometallic compounds, as expressed in both discrete molecular compounds and extended macromolecular arrays.*

**Dr. Hao Tang.** *Tang's research lab focuses on the engineering aspects of capacitive deionization technology for water desalination; emerging disinfection by-product control strategies for drinking water; and fat, oil, and grease removal from wastewater.*

**Dr. Jana Villemain.** *Using molecular biology and protein biochemistry to study the structure-function relationships of proteins; particularly focused on interactions between homologous recombination proteins in the DNA double-strand break pathway and proteins that appear to mediate it.*

### Admission

*The following documents must be submitted and will be considered when applying:*

- Online application
- \$60 nonrefundable application fee
- Bachelor's degree in a natural or physical science or engineering from an accredited institution with a GPA of 2.8 or higher. Coursework equivalent to at least a minor in Chemistry (20 credit hours)
- Official transcripts from all undergraduate institutions attended
- Written personal statement: One page describing career goals, and interest and qualifications for the program
- Two letters of recommendation
- Professional resume

**For international Students:** *The minimum acceptable IELTS score is 6.0. Minimum TOEFL score requirement is 540 (paper-based) or 76 (Internet-based).*

Graduate Admissions: [www.iup.edu/admissions/graduate/](http://www.iup.edu/admissions/graduate/)

For more information regarding Admission Classification and Provisional Admission for International Graduate Application, view the Graduate Catalog: [www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

## Financial Assistance

### Graduate Assistantships

- *The Chemistry Department offers a limited number of part time work-study positions that are available to graduate students. However, students are not guaranteed work-study. Graduate Assistantship Handbook can be found at:*
- [www.iup.edu/admissions/graduate/financialaid/assistantships-and-scholarships/](http://www.iup.edu/admissions/graduate/financialaid/assistantships-and-scholarships/)
- Office of Financial Aid: [www.iup.edu/financialaid/](http://www.iup.edu/financialaid/)

## Academic Advisement

***Dr. Sanda Andrada Maicaneanu*** (email: [Sanda.Maicaneanu@iup.edu](mailto:Sanda.Maicaneanu@iup.edu)) is the current graduate coordinator. She will serve as your primary advisor while you are in the degree program and will provide you with accurate and timely information about academic requirements and academic evaluation. She must approve your selected course work and will provide the required PIN numbers to use for course registration.

*You will also choose a research advisor, who will give advice on attaining career goals, and assist you in participating in scholarly and professional experiences that will add depth and breadth to your skills, such as lab based research, internships, and attendance at professionals meetings. There should be a mutually agreed upon set of meetings between you and your advisor so that you receive the guidance you need.*

## Campus Resources & Student Support

The School of Graduate Studies and Research: [www.iup.edu/graduatestudies/](http://www.iup.edu/graduatestudies/)

Graduate Catalog: [www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

Office of the Bursar: [www.iup.edu/bursar/](http://www.iup.edu/bursar/)

Office of the Registrar: [www.iup.edu/registrar/](http://www.iup.edu/registrar/)

Disability Support Services: [www.iup.edu/disabilitysupport/](http://www.iup.edu/disabilitysupport/)

Office of Social Equity: [www.iup.edu/social-equity/](http://www.iup.edu/social-equity/)

IUP Campus Library [www.iup.edu/library/](http://www.iup.edu/library/)

MyIUP: [www.iup.edu/myiup/](http://www.iup.edu/myiup/)

IT Support Center: [www.iup.edu/itsupportcenter/](http://www.iup.edu/itsupportcenter/)

Veterans and Service Members: [www.iup.edu/veterans/resource-center/](http://www.iup.edu/veterans/resource-center/)

IUP Writing Center: [www.iup.edu/writingcenter/](http://www.iup.edu/writingcenter/)

IUP Career and Professional Development Center: [www.iup.edu/career/](http://www.iup.edu/career/)

IUP Parking Services and Visitor Center <http://www.iup.edu/parking/>

University Police <http://www.iup.edu/police/> | 724-357-2141

Crisis Intervention 24/7 Hotline: 1-877-333-2470

Student Registration: [www.iup.edu/registrar/students/registration/](http://www.iup.edu/registrar/students/registration/)

## IUP Email

IUP offers an email account to all active students. **Your IUP email address is the primary means by which the university will contact you with official information and you should use for all IUP**

**official communications. It is your responsibility to check your IUP email regularly.** Visit [www.iup.edu/itsupportcenter/howTo.aspx?id=23401](http://www.iup.edu/itsupportcenter/howTo.aspx?id=23401) to learn more about setting up this account. For more information regarding University policy on email communication, view the Graduate Catalog: [www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

## Graduate Student Assembly

The Graduate Student Assembly (GSA) represents the graduate student body's interests at IUP and within the Indiana community. The GSA makes recommendations related University-wide and graduate-specific policies and in areas of concern in the cultural, intellectual, and social life of the part- and full-time graduate student. Visit [www.iup.edu/graduatestudies/gsa](http://www.iup.edu/graduatestudies/gsa) for more information.

## Programs and Degrees

### Master's Program

*Master's in Science, Applied and Industrial Chemistry*

*Early Registration / 4+1 Master's in Science, Applied and Industrial Chemistry*

### Course Descriptions

#### 1. Core Courses (12 crs)\*

*Usually four courses in the areas of Inorganic, Organic, Analytical, Physical chemistry, or Biochemistry. (12 credits)*

**2. Science electives (3-6 crs)\*.** *The student may select courses from the any science discipline, or they may select up to 6 credits of independent research (CHEM 690). A research report (5 pages minimum) must be completed at the end of each CHEM 690 course.*

**3. Professional Development courses (6-9 crs)\*.** *Two or three courses from the College of Business and information Technology. Courses should be at the 500 level or above. 300 or 400 level courses can be taken with the advice and consent of the graduate coordinator. Some possible courses. QBUS 601, MGMT 613, MGMT 551, MGMT 562, MGMT 650, BLAW 633*

**4. Seminar 2 - CHEM 600 (2 crs)\*.** *Students are required to present a seminar.*

**5. Internship requirement - CHEM 799 (4 crs)\*.** *The Graduate coordinator and research advisor may provide guidance in arranging an internship, but **the student is ultimately responsible for initiating and securing the internship.** The Internship should be a minimum of 3 months, and may be completed in residence at IUP, if no external internship is available. The acceptability of an internship experience is determined by the internship committee. Before an external internship can proceed, there must be a signed internship agreement with the host company on file.*

*Internship committee – The internship committee should consist of an industrial advisor, a faculty advisor, and 2 graduate faculty. A written report is required that describes your internship experience.*

*Previous work experience – Previous work in the chemical industry may be counted as an internship experience, however, an internship committee must be formed that includes a supervisor from the work site, and a paper must be written about the experience.*

**\* At least 15 credits from the total of required and elective courses must come from 600-level or higher.**

### Evaluation of Students

For information regarding School of Graduate Studies and Research policies on grading, view the Graduate Catalog: [www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

*Students take 26 credits of course work and will be evaluated on each course by their instructors. Students also take 4 credits of internship, for which they have to submit a final internship report. The internship report is evaluated by internship committee which includes three faculty members of the chemistry department.*

### **Reexamination Policy**

No student is permitted a “third” examination without a recommendation to that effect from the degree program’s sponsoring department per their adopted written procedures and the approval of the School of Graduate Studies and Research dean (or designee). Exceptions to this policy for programs can be made only with the approval of the School of Graduate Studies and Research. In the event a student does not successfully complete the comprehensive re-examination according to program requirements and the failure results in program dismissal, the program must notify the School of Graduate Studies and Research (SGSR) of the dismissal in writing. The SGSR will send an official notification of the dismissal to the student.

### Degree Completion

- *Total 30 credits including 26 credits of course work and 4 credits of internship.*
- *At least 15 credits from the total of required and elective courses must come from 600-level or higher.*

For more information, view the Graduate Catalog: [www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

### University Policies and Procedures

**University policy is the baseline policy.** Programs may have policy that is more stringent than the University baseline policy; however, not less stringent than the University baseline policy. For questions regarding this statement, please contact Dr. Sanda Andrada Maicaneanu or the School of Graduate Studies and Research.

### Academic Calendar

View the IUP Academic Calendar: [www.iup.edu/news-events/calendar/academic/](http://www.iup.edu/news-events/calendar/academic/)

The following University and SGSR policies can be found at [www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

**Academic Good Standing**

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

**Academic Integrity**

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

*The Source: A Student Policy Guide:* [www.iup.edu/studentconduct/thesource/](http://www.iup.edu/studentconduct/thesource/)

**Bereavement-Related Class Absences**

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

**Grade Appeal Policy**

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

**Graduate Fresh Start Policy**

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

**Graduate Residency Requirement**

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

**Leave of Absence Policy**

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

**Time Limitations**

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

**Time-to-Degree Masters/Doctoral Dismissal Appeal Policy**

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

**Time-to-Degree Extension for Master's Thesis and Doctoral Dissertation**

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

**Transfer of Credits Policy**

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

**Research**

*The Chemistry Department offers a limited number of part time work-study positions that are available to graduate students. The department has many active, innovative research projects in which students can directly participate. Students learn various techniques as well as important techniques including NMR, FTIR, GC-MS, TOC, and Cyclic Voltammetry, protein purification, and molecular biology.*

[www.iup.edu/gradcatalog](http://www.iup.edu/gradcatalog)

[www.iup.edu/research/](http://www.iup.edu/research/)

**Department/Program Awards**

*Best Graduate student award*

## Signature Page

My signature below indicates that I am responsible for reading and understanding the information provided and referenced in this department/program student handbook.

\_\_\_\_\_ [please initial] I understand my program coordinator may share this document with the School of Graduate Studies and Research.

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Submit to Dr. Sanda Andrada Maicaneanu by 09/20/2020

Madia Department of Chemistry will keep this signed document on file.