



**Adam Duong, Ph.D**

Married, two childrens

**Career objective:**

Academic Position, Teaching and Research

Citizenship: French and Canadian

31 rue Paul Codaccioni  
13007 Marseille, France

✉ adnadm67@yahoo.ca

☎ +33 (0)6 51 25 48 92

## PROFESSIONAL EXPERIENCE



**University d'Aix-Marseille, Marseille, Bouches-du-Rhône, France**

**current**

**Research and Teaching Assistance in organic/inorganic chemistry** (Advisor: M. Réglie)

*Research topic:* Biomimetic and bioinspired models of hydrogenases, design of dinuclear peptidic [Ru-Ni] for hydrogen production.

- Design and synthesis of peptidic Ru complex.
- Synthesis of Ni-Ru complex as useful bio-inspired models of [NiFe] hydrogenases.

### Class teaching:

- *Organic Chemistry:* 1. Nomenclature and stereochemistry, 2. Electronic and steric effects, 3. Alkanes, alkenes, alkynes, aromatics, alcohols, amines, aldehydes, ketones and carboxylic acids (undergraduate/biology-24h).
- *Inorganic Chemistry:* 1. Blocks of elements, 2. Reactivity and properties of the compounds of hydrogen, nitrogen groups, oxygen and halogens, 3. Metal coordination chemistry, crystal field theory and atomic orbitals (undergraduate/MPCI: mathematic-physics-chemistry-informatics-10h).
- *Inorganic Chemistry:* 1. Properties of elements and their reactivity, 2. Arrangement of the chemical elements in the periodic table (undergraduate/physics-chemistry-12h).
- *Chemistry for Biology:* 1. Chemistry of solutions, acid-base, pH, 2. Oxydo-reduction (undergraduate/biology-16h).
- *Inorganic Chemistry:* Reactivity of transition metal complexes (graduate/chemistry-10h).
- *Scientific Tools and Methods:* 1. Dimensions, units, uncertainty, 2. Concept of measurement in physics and chemistry, 3. Evaluation of experimental data: graph, concept, model (undergraduate/chemistry-6h).

### Laboratory instruction:

- *Inorganic Chemistry:* 1. Synthesis of metal complexes and their properties (undergraduate/mathematic-physics-chemistry-informatics-8h).
- *Inorganic Chemistry:* 1. Synthesis of Jacobsen catalyst, 2. Study of phenanthroline iron complex, 3. Characterization of ferrocene, 4. Synthesis and properties of iron complex with transition of spin (undergraduate/physical chemistry-24h).
- *Chemistry 2:* 1. Acid-base titration of weak polyacids, 2. Conductometry, acid-base indicator, 3. Complexometric titration with EDTA (graduate/physics-chemistry-24h/biology-24h/biology-24h).
- *Inorganic Chemistry:* 1. Coordination chemistry, 2. Ligand substitution, IR and UV-Vis spectroscopies (graduate/chemistry-30h in 2013).



**Lawrence Berkeley National Laboratory; Berkeley, California, USA**

**2012- 2013**

**Postdoctoral Fellow** (Advisor: Prof. Omar M. Yaghi)

*Research topic:* Preparation of extended frameworks (COFs) for applications in materials science and energy storage.

### Key achievements:

- Synthetic approaches to -D extended catenane frameworks ("chainmail").
- Synthesis of CN based COFs for use as supercapacitors in energy storage and electric power supply devices.

### Mentoring:

- Mr. Satoshi Okajima (first year graduate student, UC Berkeley): mentored in the synthesis and purification of organic compounds.



University of California Los Angeles; Los Angeles, California, USA  
Postdoctoral Fellow (Advisor: Prof. Omar M. Yaghi)

2011-2012

*Research topic:* Design and preparation of novel organic building units to create new COFs and MOFs with controllable pore sizes.

**Key achievements:**

- Metalation of porous COFs.
- Water adsorbents for thermal reservoir application: synthesis of zirconium metal-organic frameworks.

**Mentoring:**

- Mr. Kyle Cordova (second year graduate student, UCLA): mentored in multistep synthesis of organic molecules.



University of Montreal, Montreal, Quebec, Canada  
Doctorate Research, (Advisor: Prof. James D. Wuest)

2005-2011

*Research topic:* Design, synthesis and structures of 3D and 2D supramolecular networks held together by a combination of coordinative bonds and other intermolecular interactions.

**Key achievements:**

- Synthesis of ditopic ligands to explore their dual ability to direct association by the chelation of metals and the characteristic hydrogen bonding of diaminotriazinyl groups.
- Use of a hybrid organic/inorganic strategy for constructing materials in which coordinative bonds to metals are used in conjunction with other interactions, both to build the molecular components and to control their organization.
- 2D crystallizations to create thin films characterized by scanning tunneling microscopy.

**Class teaching:**

- *Organic Chemistry 1:* 1. Electronic structure of organic molecules, 2. Nomenclature, 3. Stereochemistry, 4. Reaction mechanisms, 5. Principal functional groups in organic molecules (undergraduate/120h in 2008).
- *Organic Chemistry 2:* 1. Infrared spectroscopy, 2. Alcohols, 3. Ethers, 4. Aldehydes, 5. Carboxylic acids, 6. Enols/enolates, 7. Radical reactions, 8. Mass spectrometry (undergraduate/chemistry-60h in 2008, 60h in 2005).

**Laboratory instruction:**

- *Experimental Chemistry 2:* 1. Sulfonation of polystyrene: Synthesis of a resin for ion exchange, 2. Complexes of transition metals, 3. Synthesis of Jacobsen's catalyst and its use in the enantioselective alkene epoxidation, 4. Extraction techniques, 5. Potentiometric titration of chlorides by precipitation of silver chloride salt (undergraduate/chemistry-150h in 2010, 161h in 2009/biochemistry-150h in 2011).
- *Experimental Chemistry 1:* 1. Acid-base titration, 2. Identification and characterization of organic molecules, 3. Recrystallisation and distillation, 4. Principles of combinatorial chemistry, 5. Synthesis of methyl salicylate, 6. Hydrolysis of acetylsalicylic acid and kinetics by absorbance (undergraduate/chemistry-75h in 2010, 160h in 2009, 160h in 2008, 160h in 2007, 160h in 2006).
- *Experimental Organic Chemistry 2:* 1. Identification of structures of organic molecules, 2. Utilization of NMR and IR spectroscopy techniques, 3. Analysis of functional groups (undergraduate/biochemistry-161h in 2007).

**Mentoring:**

- Mr. Samir Khedri (undergraduate researcher, University of Montreal): mentored in the synthesis and characterization of organic and organometallic compounds.



**University Louis Pasteur; Strasbourg, Bas-Rhin, France**  
**Master Research** (Advisor: Dr. D. Mandon)

2000-2004

*Research topic:* Design, synthesis and structure of complexes based on the first row of transition metals for environment protection: potential strategy for water treatment.

**Key achievements:**

- Synthesis of helical ligand for selective coordination to transition metals in an aqueous solution containing Co(II), Fe(II), Ni(II), Cu(II) and Zn(II).
- Preparation and coordination of a macrocycle based on tris(2-pyridylmethyl)amine for biomimetic catalysis.



**Centre de traumatologie et d'orthopédie, Illkirch, Bas-Rhin, France**  
**IUT Training Period** (Advisor: Dr. G. Féraud)

2000

Blood analysis in biomedical laboratory in collaboration with hospitals.

## EDUCATION

**University of Montreal, Department of Chemistry; Montreal, Quebec, Canada**

**Doctor of Philosophy (Ph. D.) in Chemistry** (Advisor: Prof. James D. Wuest) **2011**

Topic: Controlling Molecular Organization in Two and Three Dimensions Using Hydrogen Bonds, Metal Coordination, and Other Interactions

**University Louis Pasteur, Department of Chemistry; Strasbourg, Bas-Rhin, France**

**DEA in Transition Metal Chemistry and Molecular Engineering** (Advisor: Dr. D. Mandon) **2004**

Topic: Coordination of 2,6-Bis[N-(2-methyl-8-quinolyl)carbamoyl]pyridine to Late Transition Metals of the First Row: A Molecular Approach (Part 2)

**University Louis Pasteur, Department of Chemistry; Strasbourg, Bas-Rhin, France**

**Maîtrise in Chemistry** (Advisor: Dr. D. Mandon) **2003**

Topic: Coordination of 2,6-Bis[N-(2-methyl-8-quinolyl)carbamoyl]pyridine to Late Transition Metals of the First Row: A Molecular Approach (Part 1)

**University Louis Pasteur, Department of Chemistry; Strasbourg, Bas-Rhin, France**

**Licence in Chemistry** **2002**

**University Louis Pasteur, Department of Chemistry; Strasbourg, Bas-Rhin, France**

**DEUG in Chemistry** **2001**

**University Robert Schuman; Illkirch, Bas-Rhin, France**

**Technical Diploma in Chemistry** (Advisor: Dr. G. Féraud) **2000**

Topic: Medical analysis

## OTHER TRAINING AND QUALIFICATIONS

- Well qualified and technically proficient research chemist with more than ten years laboratory experience and broad interests.
- Leading an original project in the world's highest-ranked chemistry research group (Yaghi Laboratory) according to Thomson-Reuters.
- Proficient in organic chemistry, including multi-step synthesis and purification by various methods.
- Proficient in inorganic chemistry, including synthesis of ligands and their coordination in inert conditions.
- Proficient in large-scale synthesis and handling air-sensitive/pyrophoric inorganic compounds by Schlenk and glove box techniques.
- Experienced in design, synthesis and characterization of covalent organic frameworks (COFs) and their use in gas storage and nanotechnology.
- Experienced in imaging techniques such as SEM, TEM, AFM and STM.
- Experienced in many analytical techniques, including NMR (liquid and solid), IR, X-ray diffraction, ESI-MS, UV-VIS, thermal analysis (TGA), and porosimetry.

- Experienced in writing reports, proposals, and successful manuscripts to top-tier scientific journals, including *J. Am. Chem. Soc.*, *J. Org. Chem.*, *Inorg. Chem.*, *J. Phys. Chem.*, *Langmuir*, *CrystEngComm*, and *Cryst. Growth Des.*
- Experienced in working in the highest safety standard environments (UdeM, UCLA, UC, Berkeley labs and LBNL) with very frequent safety audits and trainings, qualified in first aid, experienced in writing SOPs and participating in major laboratory housekeeping operations on a regular basis.
- Contribution to the elaboration of manuals for a new program: MPCCI (math-physics-chemistry-informatics).
- Pedagogic training for teaching assistant, CEFES.

## PUBLICATIONS

### Postdoctoral Publications:

1. Zhang, Y.-B.; Su, J.; Furukawa, H.; Yun, Yifeng.; Gándara, Felipe.; **Duong, A.**; Zou, X.; Yaghi, O.M. “Single-Crystal Structure of a Covalent Organic Framework.” *J. Am. Chem. Soc.* **2013**, *135*, 16336.

### Doctoral Publications:

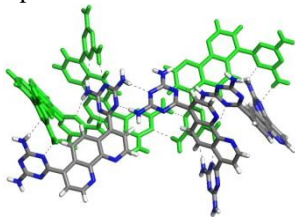
2. **Duong, A.**; Dubois, M.-A.; Wuest, J. D. “2D Molecular Organization of Pyridinecarboxylic Acids Adsorbed on Graphite.” *Langmuir* **2010**, *26*(23), 18089-18096.
3. **Duong, A.**; Maris, T.; Wuest, J. D. “Structural Similarity of Hydrogen-Bonded Networks in Crystals of Isomeric Pyridyl-Substituted Diaminotriazines.” *Cryst. Growth Des.* **2011**, *11*(1), 287-294.
4. **Duong, A.**; Maris, T.; Wuest, J. D. “Syntheses and Structures of Isomeric Diaminotriazinyl Substituted 2,2'-Bipyridines and 1,10-Phenanthrolines.” *J. Org. Chem.* **2011**, *76*(5), 1333-1341.
5. **Duong, A.**; Maris, T.; Wuest, J. D. “Engineering Homologous Molecular Organization in 2D and 3D. Cocrystallization of Aminoazines and Alkanecarboxylic Acids.” *CrystEngComm.* **2011**, *13*, 5571-5577 (Cover Article).
6. **Duong, A.**; Dubois, M.-A.; Maris, T.; Métivaud, V.; Yi, J.-H.; Nanci, A.; Rochefort, A.; Wuest, J. D. “Engineering Homologous Molecular Organization in 2D and 3D. Cocrystallization of Pyridyl-Substituted Diaminotriazines with Alkanecarboxylic Acids.” *J. Phys. Chem. C.* **2011**, *115*(26), 12908-12919.
7. **Duong, A.**; Maris, T.; Wuest, J. D. “trans-Dichloridobis[(pyridin-4-yl)boronic acid-κN]palladium(II) dimethyl sulfoxide disolvate<sub>2</sub>” *Acta Cryst.* **2011**, *E67*, m518.
8. **Duong, A.**; Maris, T.; Wuest, J. D. “Using Pyridinyl-Substituted Diaminotriazines to Bind Pd(II) and Create Metallotectons for Engineering Hydrogen-Bonded Crystals.” *Inorg Chem.* **2011**, *50*(12), 5605-5618.
9. **Duong, A.**; Maris, T.; Métivaud, V.; Wuest, J. D. “Surrogates of 2,2'-Bipyridine Designed to Chelate Ag(I) and Create Metallotectons for Engineering Hydrogen-Bonded Crystals.” *Cryst. Growth Des.* **2011**, *11*(5), 2026-2034.
10. **Duong, A.**; Maris, T.; Wuest, J. D. “Bis(2,2'-bipyrimidine-[kappa]<sup>2</sup>[N<sup>1</sup>],N<sup>1'</sup>)palladium bis(tetrafluoroborate)acetonitrile monosolvate.” *Acta Cryst.* **2012**, *E68*, m1347.
11. **Duong, A.**; Maris, T.; Wuest, J. D. “Controlling Molecular Organization by Using Phenyl embraces of Multiple Trityl Groups”, (en preparation).

## SCIENTIFIC PRESENTATIONS

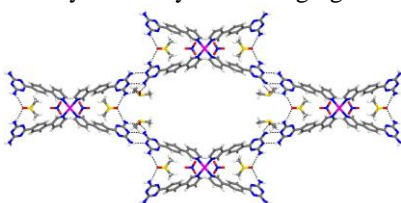
1. **A. Duong**, “De la molécule aux matériaux pour l'énergie.” Invited speaker, Trois-Rivières, June 2014.
2. **A. Duong**, “Molecular Tectonics and Reticular Chemistry: Strategies for Building Predictable Ordered Architectures.” Invited speaker, Halifax, May 2013.
3. **A. Duong**, “Nucleophilic substitution SN<sub>1</sub> and SN<sub>2</sub>”. Lecture, Halifax, May 2013.
4. **A. Duong**, “Controlling Molecular Organization in Two and Three Dimensions Using Hydrogen Bonds, Metal Coordination, and Other Interactions.” Thesis Defense, Montréal, June 2011.
5. **A. Duong**, T. Maris & J. D. Wuest, “Constructing Molecular Networks from Metallotectons.” 94<sup>th</sup> Canadian Chemistry Conference and Exhibition, Montréal, June 2011.
6. **A. Duong**, T. Maris & J. D. Wuest, “Engineering Homologous Molecular Organization in 2D and 3D. Cocrystallization of Aminoazines and Alkanecarboxylic Acids.” Ateliers Franco-Canadien de Chimie Supramoléculaire, Montréal, June 2011.
7. **A. Duong**, T. Maris & J. D. Wuest, “Learning About Molecular Association by Comparing the 2D and 3D Crystallization and Co-Crystallization of Aminotriazines.” 93<sup>rd</sup> Canadian Chemistry Conference and Exhibition, Toronto, May 2011.
8. **A. Duong**, T. Maris & J. D. Wuest, “Self-assembly of Metallotectons to Create Networks.” 90<sup>th</sup> Canadian Chemistry Conference and Exhibition, Winnipeg, May 2007.
9. **A. Duong**, T. Maris & J. D. Wuest, “Use of Metal Coordination to Direct Supramolecular Assembly.” 89<sup>th</sup> Canadian Chemistry Conference and Exhibition, Halifax, June 2006.

## ACHIEVEMENTS

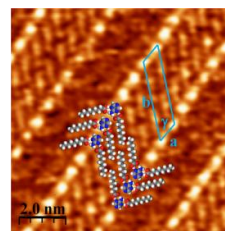
Examples of 2D and 3D structures studied by RX or by STM imaging.



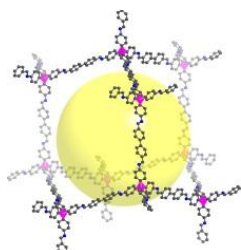
Organic materials



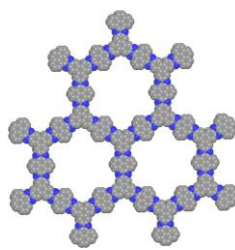
Hybrid materials/catalysis



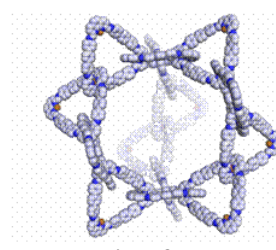
Surface functionalization



3-D COFs for gas storage



2-D COF for battery



Mechanical frameworks

## COMPUTER SOFTWARE

**Software:** Accelrys Materials Studio, Mercury, ChemDraw, Microsoft Word, Excel, Powerpoint

## LANGUAGES



**French:** Fluent



**Vietnamese:** Mother tongue



**English:** Fluent

**Arabic:** Beginner

## OTHER ACTIVITIES

**Travels:** USA (New York, Los Angeles, San Jose, San Francisco), Canada, Vietnam, Morocco, Turkey, Europe (UK, Belgium, Switzerland, Germany)

## REFERENCES

Prof. James D. Wuest  
Département de chimie  
Université de Montréal  
2900 Édouard Montpetit  
Montréal, Québec H3T 1J4  
514-340-5178  
[james.d.wuest@umontreal.ca](mailto:james.d.wuest@umontreal.ca)

Prof. Omar M. Yaghi  
Department of Chemistry  
University of California Berkeley  
602 Latimer Hall  
Berkeley, CA 94720  
510 643-5507  
[yaghi@berkeley.edu](mailto:yaghi@berkeley.edu)

Prof. Marius Réglier  
Département de chimie  
Université d'Aix-Marseille  
27 Av. Esc. Normandie-Niemen  
13397 Marseille cedex 20  
04.91.28.88.23  
[marius.reglier@univ-amu.fr](mailto:marius.reglier@univ-amu.fr)

Prof. Frédéric Dallemer  
Département de chimie  
Université d'Aix-Marseille  
27 Av. Esc. Normandie-Niemen  
13397 Marseille cedex 20  
04.13.55.18.17  
[frederic.dallemer@univ-amu.fr](mailto:frederic.dallemer@univ-amu.fr)

Dr. Bruno Faure  
Département de chimie  
Université d'Aix-Marseille  
27 Av. Esc. Normandie-Niemen  
13397 Marseille cedex 20  
04.91.28.27.03  
[bruno.faure@univ-amu.fr](mailto:bruno.faure@univ-amu.fr)

Prof. Davit Zargarian  
Département de chimie  
Université de Montréal  
2900 Édouard Montpetit  
Montréal, Québec H3T 1J4  
514-343-2247  
[zargarian.davit@umontreal.ca](mailto:zargarian.davit@umontreal.ca)