Jonas G. Croissant

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EDUCATION

● **Ph.D.**	**Materials Science**	École Nationale Supérieure de Chimie de Montpellier Montpellier, France.	2014
● **M.S.**	**Chemical Sciences**	Université Montpellier II Montpellier, France.	2011
● **B.S.**	**Chemical Sciences**	Université Montpellier II Montpellier, France.	2009

PH.D. DISSERTATION: "**Two-Photon-Actuated Theranostic Nanomedicine for Cancer Treatment**" advised by **Drs. Jean-Olivier Durand and Michel Wong-Chi-Man.** Due to the lack of selectivity of current cancer therapies, highly selective two-photon-actuated spatiotemporal anti-cancer nanoplatforms were pioneered with mesoporous silica, periodic mesoporous organosilica, and bridged silsesquioxane nanomaterials for in-vitro nanomedicine. Drug delivery nanomachines were also designed in collaboration with Dr. Jeffrey I. Zink. **This pluridisciplinary work at the frontier of chemistry, physics, and biology lead so far to thirteen publications in three years of doctoral research (French Ph.D.), and was judged "exceptional" by the Dr. Mireille Blanchard-Desce, president of the thesis jury**.

AWARDS

● **Thesis Prize Languedoc-Roussillon**	Société Chimique de France	2015
● **Thesis Prize**	Balard Chemistry Foundation	2015
● **First Prize of Oral Communication**	Société Chimique de France	2013
"1st Young Researcher's Mediterranean Workshop", Montpellier, France.		
● **Mobility and Excellency Scholarship**	Balard Chemistry Foundation	2011
● **Mobility and Excellency Scholarship**	Université Montpellier II	2011
● **Merit Fellowships**	Université Montpellier II	2009, 2010, 2011

Top of the year in B.S and M.S. (1st rank over 30 students). Best Master Thesis.

PROFESSIONAL EXPERIENCE

● **Postdoctoral Researcher** KAUST/UCLA 11/14-present
Design of organosilica nanomaterials, advised by Drs. Niveen M. Khashab and Jeffrey I. Zink.
● **Graduate Research Assistant** UCLA 01/11-01/12
Design of mesoporous silica plasmonic nanovalves, advised by Dr. Jeffrey I. Zink.
● **Undergraduate Research Assistant** Université Montpellier II 06/10-09/10
Research on phenyl boronate materials advised by Dr. Danielle Laurencin.
● **Chemical Technician Intern** AXENS© 04/08-06/08
Characterizations of molybdenum-based catalysts for the international petrochemical company.

TEACHING AND MENTORING EXPERIENCE

● **Research Supervisor** Université Montpellier II 10/14-12/14
Supervision of two visiting Ph.D. students, with peer-reviewed publication (see reference #6).
● **Teaching Assistant** Université Montpellier II 02/14-04/14
First year organic chemistry laboratory classes.

● **Laboratory Mentor** École Nationale Supérieure de Chimie de Montpellier 07/12-07/14
Laboratory and thesis writing supervision of two undergraduate and three graduate students.
● **Laboratory Mentor** KAUST 11/14-10/16
Research plan, laboratory, and publication writing supervision of four Ph.D. students.

RESEARCH INTERESTS

● **Organosilica hybrid nanomaterials**: mesoporous organosilica, periodic mesoporous organosilica, silsesquioxane nanoparticles.
● **Metal and metal-oxides nanomaterials**: gold, silver, iron oxide nanoparticles.
● **Nanomedicine**: drug delivery, photothermal and photodynamic therapies, imaging.

TEACHING INTERESTS

● First year chemistry classes.
● Principles of materials science, inorganic chemistry, general chemistry.

PEER-REVIEWED PUBLICATIONS

16. Y. Fatieiev, **J. G. Croissant**, K. Julfakyan, L. Deng, D. H. Anjum, N. M. Khashab,* "Enzymatically Degradable Hybrid Organic-Inorganic Bridged Silsesquioxane Nanoparticles for In-Vitro Imaging", *Nanoscale*, **2015**, 7, 15007. Front Cover.

15. **J. Croissant**, C. Qi, O. Mongin,* V. Hugues, M. Blanchard-Desce, L. Raehm, X. Cattoën, M. Wong Chi Man, M. Maynadier, M. Garcia, M. Gary-Bobo, J. I. Zink,* J-O. Durand,* "Disulfide-Gated Mesoporous Silica Nanoparticles Designed for Two-Photon-Triggered Drug Release and Imaging", *J. Mater. Chem. B*, **2015**, 3, 6456.

14. **J. Croissant**,† C. Mauriello-Jimenez,† X. Cattoën, M. Wong Chi Man, L. Raehm, M. Maynadier, M. Gary-Bobo, M. Garcia, P. Maillard, J-O. Durand,* "Synthesis of Disulfide-Based Biodegradable Bridged Silsesquioxane Nanoparticles for Two-Photon Imaging and Therapy of Cancer Cells", *Chem. Commun.*, **2015**, 51, 12324.

13. **J. Croissant**,* O. Mongin,* V. Hugues, M. Blanchard-Desce, X. Cattoën, M. Wong Chi Man, M. Maynadier, M. Garcia, M. Gary-Bobo, L. Raehm, J-O. Durand,* "Influence of the Synthetic Method on the Properties of Two-Photon-Sensitive Mesoporous Silica Nanoparticles", *J. Mater. Chem. B*, **2015**, 3, 5182.

12. C. Mauriello-Jimenez, **J. Croissant**, M. Maynadier, X. Cattoën, M. Wong Chi Man, J. Vergnaud, V. Chaleixb, V. Sol, M. Garcia, M. Gary-Bobo, L. Raehm, J-O. Durand,* "Porphyrin-Functionalized Mesoporous Organosilica Nanoparticles for Two-Photon Imaging of Cancer Cells and Drug Delivery", *J. Mater. Chem. B*, **2015**, 3, 3681.

11. S. Li, B. A. Moosa, **J. G. Croissant**, N. M. Khashab,* "Electrostatic Assembly/ Disassembly of Nanoscaled Colloidosomes for Light-Triggered Cargo Release", *Angew. Chem. Int. Ed.*, **2015**, 127, 6908. Selected as "Hot Paper" and Inside Back Cover. Highlighted in NatureAsia.com.

10. **J. Croissant**,***** X. Cattoën,* M. Wong Chi Man, P. Dieudonné, C. Charnay, L. Raehm, J-O. Durand,* "One-Pot Construction of Multipodal Hybrid Periodic Mesoporous Organosilica Nanoparticles with Crystal-Like Architectures", *Adv. Mater.*, **2015**, 27, 145.

9. **J. Croissant**, M. Maynadier, O. Mongin, V. Hugues, M. Blanchard-Desce, X. Cattoën, M. Wong Chi Man, A. Gallud, M. Gary-Bobo, M. Garcia, L. Raehm, J-O. Durand,*

"Enhanced Two-Photon Fluorescence Imaging and Photodynamic Therapy of Cancer Cells via Gold@Bridged Silsesquioxane Nanoparticles", *Small*, **2015**, 11, 295.

8. **J. Croissant**, D. Salles, M. Maynadier, O. Mongin, V. Hugues, M. Blanchard-Desce,* X. Cattoën, M. Wong Chi Man, A. Gallud, M. Garcia, M. Gary-Bobo,* L. Raehm, J-O. Durand,* "Mixed Periodic Mesoporous Organosilica Nanoparticles and Core-Shell Systems, Application to In-Vitro Two-Photon Imaging, Therapy and Drug Delivery", *Chem. Mater*., **2014**, 26, 7214.

7. **J. Croissant**,***** X. Cattoën, M. Wong Chi Man, A. Gallud, L. Raehm, M. Maynadier,* J-O. Durand,* "Biodegradable Ethylene-Bis(Propyl)Disulfide-Based Periodic Mesoporous Organosilica Nanorods and Nanospheres for Efficient In-Vitro Drug Delivery", *Adv. Mater*., **2014**, 26, 6174.

6. S. Dib, M. Boufatit, S. Chelouaou, F. Sadi-Hassaine, **J. Croissant**,***** J. Long, L. Raehm, C. Charnay, J-O. Durand, "Versatile Heavy Metals Removal via Magnetic Mesoporous Nanocontainers", *RSC Adv*., **2014**, 4, 24838.

5. **J. Croissant**, A. Chaix, O. Mongin, M. Wang, S. Clément, L. Raehm, J-O. Durand,* V. Hugues, M. Blanchard-Desce, M. Maynadier, A. Gallud, M. Gary-Bobo,* M. Garcia, J. Lu, F. Tamanoi, D. P. Ferris, D. Tarn, J. I. Zink,* "Two-Photon-Triggered Drug Delivery via Fluorescent Nanovalves", *Small*, **2014**, 10, 1752. Article level metrics = 108 (13 online news outlets), 2nd highest scoring article in Small, top 5% of 2,637,241 articles ever tracked.

4. X. Cattoën,* A. Noureddine, **J. Croissant**, N. Moitra, K. Bürglová, J. Hodačová, O. De Los Cobos, M. Lejeune, F. Rossignol, D. Toulemon, S. Bégin-Colin, B. P. Pichon, L. Raehm, J-O. Durand, M. Wong Chi Man, "Click Approaches in Sol-Gel Chemistry", *J. Sol-Gel Sci. Technol*., **2014**, 70, 245.

3. **J. Croissant**, M. Maynadier, A. Gallud, H. P. N'Dongo, J. L. Nyalosaso, G. Derrien, C. Charnay, J-O. Durand,* L. Raehm, F. Serein-Spirau, N. Cheminet, T. Jarrosson, O. Mongin, M. Blanchard-Desce, M. Gary-Bobo,* M. Garcia, J. Lu, F. Tamanoi, D. Tarn, T. M. Guardado-Alvarez, J. I. Zink,* "Two-Photon-Triggered Drug Delivery in Cancer Cells via Nanoimpellers", *Angew. Chem. Int. Ed*., **2013**, 125, 14058.

2. **J. Croissant**, J. I. Zink,* "Nanovalve-Controlled Cargo Release Activated by Plasmonic Heating", *J. Am. Chem. Soc*., **2012**, 134, 7628. Hot paper.

1. M. Reinholdt, **J. Croissant**, L. Di Carlo, D. Granier, P. Gaveau, S. Bégu, J-M. Devoisselle, P. H. Mutin, M. E. Smith, C. Bonhomme, C. Gervais, A. van der Lee, D. Laurencin,* "Synthesis and Characterization of Crystalline Structures Based on Phenylboronate Ligands Bound to Alkaline Earth Cations", *Inorg. Chem*., **2011**, 50, 7802.

PUBLICATIONS IN PROGRESS (†These authors equally contributed to this work)

7. Y. Fatieiev,† **J. G. Croissant**,† S. Alsaiari, B. A. Moosa, N. M. Khashab,* "Bridged Silsesquioxane Nanoparticles with Tunable Morphologies for Light-Triggered DNA Delivery", **2015**, *submitted*, am-2015-07365q.

6. **J. G. Croissant**,* X. Cattoën, M. Wong Chi Man, J-O. Durand,* N. M. Khashab,* "Synthesis and Applications of Periodic Mesoporous Organosilica Nanoparticles", **2015**, *submitted*, NR-REV-08-2015-005649.

5. **J. G. Croissant**, M. Gary-Bobo, M. Garcia, O. Mongin, M. Blanchard-Desce, J-O. Durand,* "Multifunctional Gold-Mesoporous Organosilica Nanocomposites for Enhanced Two-Photon Photodynamic Therapy and Imaging in Cancer Cells", **2015**, *to be submitted*.

4. D. Zhang,† **J. G. Croissant**,† J. Lu, L. Deng, A. Mashat, L. Hu, F. Tamanoi, J. I. Zink, N. M. Khashab,* "Multifunctional Mesoporous Silica Nanoparticles Gated with Protein-Gold Cluster for Targeted Autonomous Drug Delivery, Nuclear Staining and In-vivo NIR Tumor Imaging", **2015**, *to be submitted*.

3. **J. G. Croissant**, J-O. Durand, J. I. Zink, N. M. Khashab, "Organosilica Spatiotemporal Anti-Cancer Nanomedicine via Two-Photon Excitation", **2015**, *to be submitted*.

2. **J. G. Croissant**, J. I. Zink,* "Controllable Photodegradation of Mesoporous Silica Encapsulating Gold Cores for Remote Cargo Release", **2015**, *to be submitted*.

1. **J. G. Croissant**, M. Maynadier,* M. Blanchard-Desce, A. Delalande, P. Midoux, C. Pichon, M. Gary-Bobo, M. Garcia, L. Raehm, S. Clément, N. Cheminet, F. Serein-Spirau, T. Jarrosson, J-O. Durand,* "Two-Photon-Triggered Gene Silencing in Cancer Cells with Cationic Azobenzene-Engineered Mesoporous Silica Nanoparticles", **2015**, *to be submitted*.

PROCEEDINGS

J. Lu, **J. Croissant**, J-O. Durand, T. Guardado-Alvarez, J. I. Zink, F. Tamanoi, "Light-Controllable Nano-Drug Delivery System with Deep Tissue Penetrating Ability for Cancer Therapy with Two-Photon-Triggered Nanoimpellers", *Cancer Res.*, **2014**, 74.19 Supplement : LB-9. AACR.

CONFERENCES PRESENTATIONS

● **3 international oral presentations**: "Recent developments in advanced membranes and porous materials for energy, environmental and water applications", *King Abdullah University of Science and Technology*, Thuwal, Saudi Arabia (02/25/**15**). "Nanoparticles for biomedical applications", *Institut Européen des Membranes*, Montpellier, France (03/10/**13**). "Nano-hybrid 9 conference", Como, Italy (05/20/**12**-05/24/**12**).
● **2 regional oral presentation**: "1st young researcher's mediterranean workshop", *École Nationale Supérieure de Chimie de Montpellier*, Montpellier, France (10/17/**13**-10/18/**13**). "Three minutes thesis" regional finalist, *Institut de Botanique*, Montpellier, France (05/26/**14**).

INVITED TALKS

● **Centre National de Recherche Scientifique**, Montpellier, France: "Biodegradable ethylene-bis(propyl)disulfide-based periodic mesoporous organosilica nanorods and nanospheres for efficient in-vitro drug delivery" (07/24/**14**).
● **École Nationale Supérieure de Chimie de Montpellier**: "Two-photon-triggered drug delivery in cancer cells via nanoimpellers" (04/19/**13**). "Nanovalve-controlled cargo release activated by plasmonic heating" (03/01/**12**).
● **Université Montpellier II**: "From two-photon photosensitizer to bridged silsesquioxane and periodic mesoporous organosilica nanoparticles: application to cancer theranostic" (02/30/**14**). "Two-photon activated nanoimpellers for in-vitro studies" (02/15/**13**). "Mesoporous silica nanoparticles photothermal drug delivery system" (02/17/**12**).
● **California NanoSystems Institute**: "Synthesis and biomedical applications periodic mesoporous organosilica nanoparticles", Electron Imaging Center for Nanomachines, Los Angeles, California USA (06/19/**15**).

PROFESSIONAL MEMBERSHIP AND SERVICES

● Member of the **Société Chimique de France**.
● Reviewer for the **Royal Society of Chemistry**: *J. Mater. Chem. B and C, Nanoscale, RSC Adv., Analyst, Inorg. Front., New J. Chem., Green Chem., Chem. Commun., Dalton Trans.*
● Reviewer for the **American Chemical Society**: *Biomacromolecules*.
● Reviewer for the *Express Polymer Letters* journal.
● Reviewer for **Nature Publishing Group**: *Scientific Reports*.

REFERENCES

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