PERSONAL INFORMATION

Family name, First name: MARON Laurent

Researcher unique identifier(s) (such as ORCID, Research ID, etc. ...):

Date of birth: 14/12/1973

URL for web site:http://lpcno.insa-toulouse.fr

- **EDUCATION**

1999	PhD in Theoretical Chemistry *cum laude* Université Paul Sabatier/ Department of Chemistry/ Toulouse, France
1999	PhD in Theoretical Physics Stockholm Universitet/ Department of Physics/ Stockholm, Sweden
1996	National Master of theoretical Chemistry (rank 1) Université Paul Sabatier/ Department of Chemistry/ Toulouse, France

- **CURRENT POSITION(S)**

2008 –	Full Professor PRCE2 since 2017 Université Paul Sabatier/ Department of Chemistry/ Toulouse, France
2001 – 2008	Associated Professor Université Paul Sabatier/ Department of Chemistry/ Toulouse, France

- **PREVIOUS POSITIONS**

1999 – 2001	Post-doctoral Fellow (sponsored by Michelin manufactory) Université Montpellier 2/ Department of Chemistry/ Montpellier, France

- **FELLOWSHIPS AND AWARDS**

2006 – 2011	Junior Member of the Institut Universitaire de France
2010 – 2014	Humboldt Fellowship for advanced researchers / Aachen University / Germany
2015	Chinese Academy of Science Professorship / Shangai State Laboratory / China
2016	Visiting Professor University of Calgary / Canada
2017	Visitng Professor Fudan University / China
2018	Humboldt Fellowship for advanced researchers / Braunschweig University / Germany
2018	RSC-SCF Award: Lectureship in Chemical Science
2021	Chinese Academy of Science Professorship / Shanghai Institute of Organic Chemsitry Laboratory / China
2019- 2024	Senior Member of the Institut Universitaire de France

- **SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS**

2001 – 2021	14 PDRA/ 24 phD students/ 15 Master students Université Paul Sabatier/ Department of Chemistry/ Toulouse, France

- **TEACHING ACTIVITIES**

2008 – Full Professor – Physical Chemistry and Organometallic/Inorganic Chemistry/ Université Paul Sabatier/ Department of Chemistry/ Toulouse, France
2001 – 2008 Assistant Professor – Physical Chemistry and Organometallic/Inorganic Chemistry/ Université Paul Sabatier/ Department of Chemistry/ Toulouse, France
1996 – 1999 Teaching Assistant – Physical Chemistry/Université Paul Sabatier/ Department of Chemistry/ Toulouse, France

- **ORGANISATION OF SCIENTIFIC MEETINGS**

2000 7ème RCTF, 150 attendees, Gruissan, France (member of the organizing commitee)
2003 VHM 2003, 120 attendees, La Colle sur Loup, France
2005 EUCOCC5, 165 attendees, La Londe les Maures, France (Trésorier adjoint)
2006 VHM 2006, 118 attendees, Aubrac, France (Trésorier)
2006 10ème Journée de la Matière Condensée, 500 attendees, Toulouse (member of the organizing commitee)
2009 VHM 2009, 123 attendees, Canet en Rousillon, France (President)

- **INSTITUTIONAL RESPONSIBILITIES**

2012 – 2016 Member of the management committee of the Chemsitry department Université Paul Sabatier/ Department of Chemistry/ Toulouse, France
2012 – 2020 Member of the Comité National des Unversités / National / France
2011 – 2014 Member of a Management Committee COST action cm1006
2006 – 2012 Responsible of the 3rd year of Chemistry (120 students) Université Paul Sabatier/ Department of Chemistry/ Toulouse, France

- **COMMISSIONS OF TRUST**

2010 – International Advisory Board of Dalton Transactions
2012 Review panel member, Université Paris VI / MONARIS / France
2012 Review panel member, Université Paris VI / LCT / France
2016 Review panel member, Université Nancy / France
2017 Review panel member, Université Marseille / France
2014 – 2017 Review Panel of The Agence Nationale de La Recherche (research grants) – Vice-President
2018 Review panel member, Université Paris VI / LCT / France
2019 Review panel member, Marne-la-vallée

- **SUMMARY OF PROFESSIONAL ACHIEVEMENTS**

After a phD in theoretical chemistry in Toulouse and a phD in theoretical physics in Stockholm, I made a post-doctoral research project for the Michelin company on the theoretical treatment of the catalysis of lanthanide complexes. After, I got appointed as an assistant professor in physical chemistry in Toulouse where I started my independent research carrier on the theoretical chemistry of f element complexes. I got then promoted as a junior member in 2006 and full professor in 2008. I got then involved in the redox chemistry of f element for the activation of small molecules, like CO_2, through an ERC grant 'Frontier in Chemistry' in 2010, field where I'm to date the only one to be able to perform such calculations. Although the f-element community is rather small, I'm internationally recognized as all the experimental experts collaborate with me and now even main group experts are asking for my expertise when low-valent metal are involved (Science paper under review). Recently, I started a research project on transactinides and especially Berkelium for which I recently published a research paper in Science and a paper in Nature Chemistry. Meanwhile, I got awarded as an Experienced researcher

Humboldt Fellow (2010), a Chinese Academy of Science award (2015) and got visiting professorship in Calgary (2016) and Fudan University (2017), a Humboldt fellowship in 2018. I also receieved the RSC-SCF award in 2018. Finally, I got a Chinese Academy of Science award (2019) and was nominated as a senior member of the Institut Universitaire de France in 2019.

- **MEMBERSHIPS OF SCIENTIFIC SOCIETIES**

2010–2020 Member, American Chemical Society
2023- Fellow o the Royal Chemical Society

- **SUMMARY OF CURRENT SCIENTIFIC ACTIVITY**

My research is based on rationalizing, using theoretical approaches, the electronic structure and reactivity of metal complexes, mainly s, d and f metals. This research is carried out in very close collaboration with experimental groups either from academic or industrial side. In the industrial side, we have a long going collaboration with the Total company and the experimental group of Jean-François Carpentier (Rennes) on the metallocenes catalysed polymerization of olefins. From the academic side, we have a special interest on low-valent metals such as uranium at the +III oxidation state or lanthanide(II) and magnesium(I). This had an enormous impact in this field, particularly with regard to understanding the mechanisms of stoechiometric and catalytic reactions involving the activation of small molecules, such as CO_2, CO, N_2, by s, d or f-block metal complexes. This work in this area has changed the way the academic and industrial communities view actinide metals, and their reactivity. Through this research, and the numerous collaborations I have established with world leading experimentalists whose research encompasses the lanthanide and actinide metals, it has become clear that complexes of these metals can effect synthetic transformations previously only thought possible with transition metals, especially those of the platinum group. This has been recently extended to the coordination chemistry of transactinide complexes, mainly plutonium and berkelium, for which we have demonstrated some peculiar coordination properties, that were published in Science and Nature Chemistry.

- **MAJOR COLLABORATIONS**

C. Jones low-valent magnesium reactivity with CO_2 (Monash U., Australia)
M. Anker divalent lanthanide for catalysis (U. Wellington, New Zeland)
R. A. Andersen f-element chemistry (UC Berkeley, US)
J. Arnold d and f-complexes structure and reactivity (UC Berkeley, US)
J. Walensky actinide complexes for reactivity (U Missouri, US)
J. Robinson lanthanide-based polymerization of cyclic esters (Brown University, US)
W. J. Evans divalent lanthanide reactivity (UC Irvine, US)
C. C. Cummins titanium reactivity (MIT, US)
W. E. Piers Cobalt, Iron and cationic scandium reactivity(U Calgary, Canada)
P. L. Arnold high-valent uranium reactivity (U. Edimburgh, Scotland and UC Berkeley, US),
J. Okuda alkaline-earth reactivity (U. Aachen, Germany)
F. G. N. Cloke CO_2 reactivity with uranium complexes (U. Sussex, England)
S. Liddle low-valent uranium reactivity (U. Manchester, England)
K. Meyer small molecule activation (U. Erlangen, Germany)
P. Roesky borohydride reactivity (U. Karlshrue, Germany)
J-F. Carpentier, S. Guillaume, Y. Sarazin, E. Kirilov polymerization (U. Rennes, France)
D. Bourissou ambiphilic ligand complexes (U. Toulouse, France)
F. Bonnet, M. Visseaux olefin polymerization (U. Lille, France)
G. Nocton Lanthanide-based reactivity (Ecole Polytechnique, France)
M. Mazzanti low-valent uranium reactivity with CO_2 (EPFL, Switzerland)
Ch. Copéret silica surface reactivity (ETh Zurich, Switzerland)
Y. Chen scandium complexes reactivity (SCUT Guangzhou, China)
C. Zhu actinide structure and reactivity (U. Nanjing, China)

X. Zhou, L. Zhang rare earths complexes and clusters reactivity (Fudan U. Shanghai, China)
D. Cui, J. Cheng polymerization and actinide complexes (U. Changchun, China)
S. Wang Rare earth complexes for catalysis (U. Wuhu, China)
X. Xu Catalysis with low valent metal (U. Suzhou, China)
Y-H Chen Rare-earh catalysts for organic transformation (U. Wuhan, China)
Z. Hou f-element reactivity and clusters (RIKEN Tokyo, Japan)
M. Hill s group reactivity (U. of Bath, England)
A. Vanugopal Main group catalysis (IITER, India)

- **564 Publications / h-index: 73**

List of major Publications (last 10 years)
2 Science , 7 Nature Chemistry, 7 Nature Communication, 1 Acc. Chem. Res., 1 Chem, 1 PNAS, 37 JACS, 38 Angewandte Chemie, 23 Chemical Science, 1 Chemical Society Review, 1 JACS Au

Wilson, A. S. S.; Hill, M. S.; Mahon, M. F.; Dinoi, C.; Maron, L., Organocalcium-mediated nucleophilic alkylation of benzene. *Science* **2017,** *358* (6367), 1168-1171.
Silver, M. A.; Cary, S. K.; Johnson, J. A.; Baumbach, R. E.; Arico, A. A.; Luckey, M.; Urban, M.; Wang, J. C.; Polinski, M. J.; Chemey, A.; Liu, G.; Chen, K. W.; Van Cleve, S. M.; Marsh, M. L.; Eaton, T. M.; de Burgt, L. J. V.; Gray, A. L.; Hobart, D. E.; Hanson, K.; Maron, L.; Gendron, F.; Autschbach, J.; Speldrich, M.; Kogerler, P.; Yang, P.; Braley, J.; Albrecht-Schmitt, T. E., Characterization of berkelium(III) dipicolinate and borate compounds in solution and the solid state. *Science* **2016,** *353* (6302), 888-+.

P. L. Arnold, A.-F. Pécharman, E. Hollis, A. Yahia, L. Maron, S. J. Parsons et J. B. Love Nature Chemistry 2 (2010) 1056

Arnold, P. L.; Mansell, S. M.; Maron, L.; McKay, *Nature Chemistry* **2012,** *4* (8), 668-674.
Cary, S. K.; Galley, S. S.; Marsh, M. L.; Hobart, D. L.; Baumbach, R. E.; Cross, J. N.; Stritzinger, J. T.; Polinski, M. J.; Maron, L.; Albrecht-Schmitt, T. E., Incipient class II mixed valency in a plutonium solid-state compound. *Nature Chemistry* **2017,** *9* (9), 856-861

Halter, D. P.; Heinemann, F. W.; Maron, L.; Meyer, K., The role of uranium-arene bonding in H2O reduction catalysis. *Nature Chemistry* **2018,** *10* (3), 259-267.

Feng, G. F.; Zhang, M. X.; Shao, D.; Wang, X. Y.; Wang, S. A.; Maron, L.; Zhu, C. Q., Transition-metal-bridged bimetallic clusters with multiple uranium-metal bonds. *Nature Chemistry* **2019,** *11* (3), 248-253.

Arnold, P. L.; Ochiai, T.; Lam, F. Y. T.; Kelly, R. P.; Seymour, M. L.; Maron, L., Metallacyclic actinide catalysts for dinitrogen conversion to ammonia and secondary amines. *Nature Chemistry*. **2020,***12*, 654-659

Reiners, M.; Baabe, D.; Munster, K.; Zaretzke, M. K.; Freytag, M.; Jones, P. G.; Coppel, Y.; Bontemps, S.; del Rosal, I.; Maron, L.; Walter, M. D., NH3 formation from N-2 and H-2 mediated by molecular tri-iron complexes. *Nature Chemistry* **2020,** *12* (8).

Gardner, B. M.; Kefalidis, C. E.; Lu, E.; Patel, D.; McInnes, E. J. L.; Tuna, F.; Wooles, A. J.; Maron, L.; Liddle, S. T., Evidence for single metal two electron oxidative addition and reductive elimination at uranium. *Nature Communications* **2017,** *8*.

Du, J. Z.; Alvarez-Lamsfus, C.; Wildman, E. P.; Wooles, A. J.; Maron, L.; Liddle, S. T., Thorium-nitrogen multiple bonds provide evidence for pushing-from-below for early actinides. *Nature Communications* **2019,** *10*.
Chatelain, L.; Louyriac, E.; Douair, I.; Lu, E. L.; Tuna, F.; Wooles, A. J.; Gardner, B. M.; Maron, L.; Liddle, S. T., Terminal uranium(V)-nitride hydrogenations involving direct addition or Frustrated Lewis Pair mechanisms. *Nature Communications* **2020,** *11* (1).
Feng, B.; Xiang, L.; McCabe, K. N.; Maron, L.; Leng, X. B.; Chen, Y. F., Synthesis and versatile reactivity of scandium phosphinophosphinidene complexes. *Nature Communications* **2020,** *11* (1).
Du, J. Z.; Douair, I.; Lu, E. L.; Seed, J. A.; Tuna, F.; Wooles, A. J.; Maron, L.; Liddle, S. T., Evidence for ligand-

and solvent-induced disproportionation of uranium(IV). *Nature Communications* **2021,** *12* (1).
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E. L. Werkema, L. Maron, O. Eisenstein et R. A. Andersen J. Am. Chem. Soc. 129 (2007) 2529
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Marie Sircoglou, Sébastien Bontemps, Ghenwa Bouhadir, Nathalie Saffon, Karinne Miqueu, Weixing Gu, Maxime Mercy, Chun-Hsing Chen, Bruce M. Foxman, Laurent Maron, Oleg V. Ozerov, and Didier Bourissou J. Am. Chem. Soc. 130(2008) 16729

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Y. Sarazin, B. Liu, T. Roisnel, L. Maron and J.-F. Carpentier J. Am. Chem. Soc. 133 (2011) 9069
A. Venugopal, W. Fegler, T. P. Spaniol, L. Maron and J. Okuda J. Am. Chem. Soc. 133 (2011) 17574
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Conley, M. P.; Lapadula, G.; Sanders, K.; Gajan, D.; Lesage, A.; del Rosa, I.; Maron, L.; Lukens, W. W.; Coperet, C.; Andersen, R. A., The Nature of Secondary Interactions at Electrophilic Metal Sites of Molecular and Silica-Supported Organolutetium Complexes from Solid-State NMR Spectroscopy. *Journal of the American Chemical Society* **2016,** *138* (11), 3831-3843.

Boutland, A. J.; Carroll, A.; Lamsfus, C. A.; Stasch, A.; Maron, L.; Jones, C., Reversible Insertion of a C = C

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Mao, W. Q.; Xiang, L.; Lamsfus, C. A.; Maron, L.; Leng, X. B.; Chen, Y. F., Highly Reactive Scandium Phosphinoalkylidene Complex: C-H and H-H Bonds Activation. *Journal of the American Chemical Society* **2017,** *139* (3), 1081-1084.
Mao, W. Q.; Xiang, L.; Maron, L.; Leng, X. B.; Chen, Y. F., Nonchelated Phosphoniomethylidene Complexes of Scandium and Lutetium. *Journal of the American Chemical Society* **2017,** *139* (49), 17759-17762.
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Mukherjee, D.; Hollerhage, T.; Leich, V.; Spaniol, T. P.; Englert, U.; Maron, L.; Okuda, J., The Nature of the Heavy Alkaline Earth Metal-Hydrogen Bond: Synthesis, Structure, and Reactivity of a Cationic Strontium Hydride Cluster. *Journal of the American Chemical Society* **2018,** *140* (9), 3403-3411.

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Tian, H. W.; Hong, J. Q.; Wang, K.; del Rosal, I.; Maron, L.; Zhou, X. G.; Zhang, L. X., Unprecedented Reaction Mode of Phosphorus in Phosphinidene Rare-Earth Complexes: A Joint Experimental-Theoretical Study. *Journal of the American Chemical Society* **2018,** *140* (1), 102-105.

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plus IV Oxidation State in Molecular Complexes of Praseodymium. *Journal of the American Chemical Society* **2020,** *142* (12), 5538-5542

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P. Gualco, T.-Z. Lin, M. Sircoglou, M. Mercy, S. Ladeira, G. Bouhadir, L. M. Perez, A. Amgoune, L. Maron, F. P. Gabbai et D. Bourissou Angew. Chem., Int. Ed. 48 (2009) 9892

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