Our research interests focus on the fields of Organometallic Homogeneous Catalysis and its application towards the green chemistry and the synthesis of biologically interesting molecules. The central theme of our research is the design of new iron complexes with peculiar architectures, and their applications in homogeneous catalyzed processes relevant to fine chemical synthesis.

Our current efforts are in particular focused on the use of organometallic catalysts, especially those based on Iron but also Nickel, Manganese and Cobalt. Several major topics are investigated in our group:

- **Current research topics:**
  - Transition Metal Catalysis
  - Organometallic Chemistry
  - Organic Synthesis
  - Green Chemistry
(i) Iron Catalysts and green chemistry;
(ii) C-H activation and C-C bond formation
(iii) reduction catalyzed processes and application to bio-ressource transformation.
(iv) use of cheap and earth abundant transition metal in catalysis (iron, manganese, cobalt, nickel…)

These are summarized below:

*Iron Catalysts, earth abundant metal catalysts and green chemistry*

Transition metal chemistry has developed tremendously over the past four decades. However, many challenges such as Csp3-Csp3 coupling, alkane C-H activation, N-H activation (hydroamination), remain unresolved, and will continue to be the focuses of future research.

**Iron and earth abundant metals catalysts and green chemistry aspects** - Another interest is the use of non toxic and inexpensive catalysts based on iron but also manganese, cobalt or nickel. Numerous examples of use of catalytic amount of iron salts in catalytic transformations are described. We would like to develop new organometallic iron and earth abundant metal complexes.

*C-H activation, C-C bond formation, reduction processes*

**C-H activation and C-X bond formation** - The selective and efficient functionalization of C-H bonds has attracted much attention from both academia and industry in the past decade. Although great progress has been made in this area, new processes for the construction of C-X (X = C, Si, B ...) bonds starting from C-H bonds are still highly desirable. The synthesis of benzylic derivatives from starting materials containing a benzylic C-H bond is well known (paths 1 and 2).

![Path 1: i) base ii) R1X
Path 2: i) halogenation
           ii) nucleophile
Path 3: catalytic C-H activation](attachment:chemical_diagram.png)

Alternatively, various catalytic methods have been developed recently that allow the direct functionalization of benzylic C-H bonds (path 3) as the Gif and Fenton reactions are some of the best known examples of C-H functionalization. However, only few examples of iron-catalyzed activation of C-H bonds followed by C-C bond formation have been reported.
In the field of well-defined iron complexes used in reduction via hydrosilylation, we succeed in:

- **Well-Defined Iron Dihydride Complex for Efficient Catalytic Hydrosilation of Aldehydes and Ketones under Visible Light Activation**

  ![Reaction Scheme]

  - Pre-cat (1 mol%)
  - NaB(OEt)₄ (1 mol%)
  - PMHS (2 equiv.)
  - Toluene
  - visible light irradiation
  - 2N NaOH MeOH
  - r.t.
  - overnight

  Pre-cat:

  \[
  \begin{align*}
  &\text{Ph}_3\text{P} \quad \text{PPh}_2 \\
  &\text{Fe} \quad \text{H} \\
  &\text{H} \\
  &\text{PPh}_2 \\
  &\text{Ph}_3\text{P}
  \end{align*}
  \]


- **Cyclopentadienyl-NHC Iron Complexes for Solvent Free Catalytic Hydrosilylation of Aldehydes and Ketones**

  ![Catalyst Structure]

  - R₁ = aryl, alkyl
  - R₂ = H, Me, aryl, alkyl


- **Well-defined Cyclopentadienyl NHC iron Complex as the Catalyst for Efficient Hydrosilylation of Amides to Amines and Nitriles**

  ![Amide Conversion]

  - [Fe] (5 mol%)
  - PhSiH₃ (2-4 equiv.)
  - 100°C, 24 h,
  - R¹ = R² = Ar, Alk
  - 100°C, 24 h,
  - R³ = R² = H

**Iron Piano-Stool Phosphine Complexes for Catalytic Hydrosilylation Reaction**

\[ \text{R} = \text{H or CH}_3 \]

1) Silane = PMHS or PhSiH$_3$
   30°C to 70°C, 24h
2) Hydrolysis

**NHC-carbene Cyclopentadienyl Iron Based Catalyst for a General and Efficient Hydrosilylation of Imines**

\[ [\text{Fe}] \text{ (2-5 mol\%)} \]

\[ \text{PhSiH}_3 \]

Visible light

**Phosphine-Pyridine Iron Complexes: Synthesis, Characterizations and Application in Reductive Amination via Hydrosilylation Reaction**

**Synthesis of new Fe-NHC complexes for catalysts for hydrosilylation reactions**

\[ \text{R} = \text{H}(\text{R}) \]

1) Fe-NHC, silane
2) NaOH, MeOH, rt

**- (Cyclopentadienyl)iron(II) complexes of N-heterocyclic carbenes bearing a malonate or imidate backbone: synthesis, structure, and catalytic hydrosilylation**

\[ \text{[Fe]} \text{ (cat.)} \]

\[ \text{silane} \]

Visible light
Selective switchable iron-catalyzed hydrosilylation of carboxylic acids

![Chem. Commun. 2012, 48, 10514.](image)

Iron catalyzed hydrosilylation of esters


Selective Reduction of Esters to Aldehydes using Well-Defined NHC-Iron Catalysts

![Angew. Chem. Int. Ed., 2013](image)

Iron-catalysed tandem isomerisation/hydrosilylation reaction of allylic alcohols with amines

![RSC Advances 2014, 4, 25892](image)

Methylation of Secondary Amines Catalysed by N-Heterocyclic Carbene Piano-Stool Iron Complexes

![Chem. Commun. 2014, 50, 14229](image)

In the field of well-defined iron complexes used in hydroboration reactions, we succeed in:

(NHC)Fe(CO)$_4$ efficient pre-catalyst for selective hydroboration of alkenes.

$$\text{FG} = \text{CO} + \text{H}_2\text{Pin} \xrightarrow{[\text{Fe}](6 \text{ mol\%})} \text{FG} \xrightarrow{\text{neat, r.t., 24 h, UV (350 nm)}} 19 \text{ examples} \quad 21-80\% \text{ isolated yields}$$


Iron Catalyzed C-H Borylation of Arenes

$$\text{R} + \text{H-Bpin} \xrightarrow{[\text{Fe}](6 \text{ mol\%})} \text{R} \xrightarrow{\text{UV (350 nm)}} \text{R} \xrightarrow{X = \text{H, Me, Me}}$$


In the field of well-defined nickel complexes used in catalysis, we succeed in:

- **Hydrosilylation of aldehydes, ketones and imines catalyzed by an N-Heterocyclic Carbene-nickel hydride complex under mild conditions**

$$\text{R}^1 = \text{aryl, alky}, \text{heteroaromatic} \quad \text{R}^2 = \text{H, Me, alkyl}$$


A Convenient Nickel-Catalyzed Hydrosilylation of Carbonyl Derivatives using PMHS as the hydrosilane

$$\text{R}^1 \text{R}^2 \xrightarrow{1) \text{Ni(OAc)}_2 \cdot 4\text{H}_2\text{O (5 mol\%)} \quad \text{PCy}_3 (10 \text{ mol\%}) \quad \text{PMHS (3 - 4 equiv.)}} \xrightarrow{2) \text{Hydrolysis}} \text{R}^1 \text{R}^2$$

Nickel-Catalysed Reductive Amination with Hydrosilanes

\[ \text{Ni(OAc)}_2 (5 \text{ mol%}) \quad \text{PCY}_3 (10 \text{ mol%}) \]
\[ \text{molecular sieves} \quad 70 ^\circ \text{C}, 24 \text{ h} \]

20 examples
conv. up to 97 isolated yields 41-97%


In the field of Cobalt Catalysis

Cobalt carbonyl based catalyst for hydrosilylation of carboxamides

\[ \text{Co}_2(\text{CO})_8 (0.5 \text{ mol%}) \quad \text{PMHS (2.2 equiv.)} \]
\[ \text{toluene, } 100 ^\circ \text{C}, 3 \text{ h} \]


In the field of Manganese catalysis

Hydrosilylation of Aldehydes and Ketones Catalyzed by Half-Sandwich Mn(I)

\[ \text{N-Heterocyclic Carbene Complexes} \]


Selective reduction of carboxylic acids to aldehydes through manganese catalysed hydrosilylation

In the field of iron salts used in catalysis, we succeed in

- Development of the First Iron Chloride Catalyzed Hydration of Terminal Alkynes

\[
\begin{align*}
\text{R}==\text{H} + \text{H}_2\text{O} & \underset{\text{FeCl}_3 (10 \text{ mol\%})}{\xrightarrow{\text{DCE, 75°C \ under air}}} \text{R}==\text{O} \\
\text{Yields: 57-99\%}
\end{align*}
\]


- Iron-catalyzed one-Pot Oxidative Esterification of Aldehydes

\[
\begin{align*}
\text{R'}\text{H} + \text{ROH} & \underset{\text{Fe(ClO}_4\text{)}_3.x\text{H}_2\text{O (10 mol-%)}}{\xrightarrow{\text{H}_2\text{O}_2 (4 \text{ equiv.)}}} \text{R'}\text{OR} \\
0 \degree\text{C}, 5 \text{ h}, \text{then r.t., 15 h} & \text{Yields: 57-99\%}
\end{align*}
\]


- Iron-Catalyzed Synthesis of N-Tosylimines

\[
\begin{align*}
\text{R}\text{I} + \text{R}^2-\text{SO}_2-\text{NH}_2 & \underset{\text{FeCl}_3 (4 \text{ mol-%})}{\xrightarrow{\text{EtOH, RT, 1 h}}} \text{N}^+\text{SO}_2\text{R}^2 \\
\text{Yields up to 98\%}
\end{align*}
\]


- Ligand Free Iron-Copper Co-catalyzed Amination of Aryl Iodides

\[
\begin{align*}
\text{R}'\text{I} + \text{NH}_3.\text{H}_2\text{O} & \underset{\text{Fe}_3\text{O}_4 (10 \text{ mol-%})}{\xrightarrow{\text{Cul (10 mol-%)}}} \text{R}'\text{NH}_2 \\
\text{NaOH (2 equiv.)} & \underset{\text{EtOH, 90°C, 16h}}{\xrightarrow{\text{Yields up to 98\%}}}
\end{align*}
\]


- Cyclen-Catalyzed Henry Reaction under Neutral Conditions

\[
\begin{align*}
\text{R}\text{I}==\text{H} + \text{CH}_3\text{NO}_2 & \underset{\text{Cyclen (5 mol-%)}}{\xrightarrow{\text{RT, 24 h}}} \text{R}\text{I}-\text{NO}_2 \\
\text{Cyclen} = & \begin{pmatrix} \text{NH} & \text{HN} \\ \text{HN} & \text{NH} \end{pmatrix}
\end{align*}
\]

**C-H bond activation and Hydrosilylation with ruthenium catalysts (in collaboration with P.H. Dixneuf)**

- **Amine Synthesis via Mild Catalytic Polymethylhydroxysiloxane Hydrosilylation of Imines with [RuCl₂(p-cymene)]₂ catalyst**

  \[
  \begin{array}{c}
  \text{N} \quad R^3 \\
  \text{R}^1 \quad \text{R}^2 \\
  \end{array}
  \quad + \quad \text{PMHS} \quad \xrightarrow{\text{[RuCl₂(p-cymene)]₂ (1-2 mol\%)}} \quad \text{Ethanol, r.t., under air} \quad \begin{array}{c}
  \text{N} \quad R^3 \\
  \text{R}^1 \quad \text{R}^2 \\
  \end{array}
  \]

  \[ R^1 = \text{aryl, alkyl} \quad R^2 = \text{H, aryl, alkyl} \]

  Yields: 67-97%


- **Unexpected Selectivity in Ruthenium-Catalyzed Hydrosilylation of Primary Amides: Synthesis of secondary amines**

  \[
  \begin{array}{c}
  \text{R} \quad \text{CO} \\
  \quad \text{NH}_2 \\
  \end{array}
  \quad + \quad \text{PhSiH}_3 \quad (3 \text{ equiv.}) \quad \xrightarrow{\text{[RuCl₂(mesitylene)]₂ (1-2 mol\%)}} \quad \text{neat conditions, 100 °C} \quad \begin{array}{c}
  \text{R} \quad \text{H} \quad \text{N} \quad \text{R} \\
  \end{array}
  \]

  B. Li, J.-B. Sortais, C. Darcel, *Chem. Commun.* 2013, 49, 3691

- **Sequential Catalysis for the Production of Sterically Hindered Amines: Ru(II)-Catalyzed C-H Bond Activation and Hydrosilylation of Imines**


- **Catalytic C-H bond arylation of imines in Water with Ruthenium(II)-Acetate Catalyst**

  \[
  \begin{array}{c}
  \text{R} \quad \text{N} \quad \text{H} \\
  \text{R}^1 \quad \text{H} \\
  \text{R} \quad \text{N} \quad \text{H} \quad \text{R}^1 \\
  \end{array}
  \quad + \quad \text{Ar-Br (excess)} \quad \xrightarrow{\text{Ru(II) / KOAc / PPh₃}} \quad \text{Ar} \quad \text{N} \quad \text{Ar} \quad \xrightarrow{\text{H₂SiPh₂ / Ru(II)}} \quad \begin{array}{c}
  \text{R} \quad \text{N} \quad \text{Ar} \\
  \text{R} \quad \text{N} \quad \text{Ar} \\
  \end{array}
  \]

  Yields: 53-88%

- Ruthenium(II) catalysed synthesis of unsaturated oxazolines via arene C–H bond alkenylation

![Chemical structure](image)


- Cyclometallation of arylimines and nitrogen-containing heterocycles via room-temperature C–H bond activation with arene ruthenium(II) acetate complexes

![Chemical structure](image)


- Ruthenium(II)-catalysed Functionalisation of C–H Bonds via a Six-membered Cyclometallate: Monoarylation of Aryl 2-pyridyl Ketones

![Chemical structure](image)

B. Li, C. Darcel, P. H. Dixneuf, *ChemCatChem* 2014, 6, 127.

- \(sp^3\)-C–H bond alkylation of ketones with alkenes via ruthenium(II) catalysed dehydrogenation of alcohols

![Chemical structure](image)

Recent publications since 2009

[1] Development of the First Iron Chloride Catalyzed Hydration of Terminal Alkynes

[2] I on-catalyzed one-Pot Oxidative Esterification of Aldehydes


[4] Ligand Free Iron-Copper Co-catalyzed Amination of Aryl Iodides

[5] Cyclen-Catalyzed Henry Reaction under Neutral Conditions


[8] Well-defined Cyclopentadienyl NHC iron Complex as the Catalyst for Efficient Hydrosilylation of Amides to Amines and Nitriles

[9] Sequential Catalysis for the Production of Sterically Hindered Amines: Ru(II)-Catalyzed C-H Bond Activation and Hydrosilylation of Imines

[10] Iron Piano-Stool Phosphine Complexes for Catalytic Hydrosilylation Reaction


[12] NHC-carbene Cyclopentadienyl Iron Based Catalyst for a General and Efficient Hydrosilylation of Imines

[13] Amine Synthesis via Mild Catalytic Polymethylhydroxysiloxane Hydrosilylation of Imines with [RuCl₂(p-cymene)]₂ catalyst

P. Bheeter, M. Henrion, L. Brelot, C. Darcel, M. J. Chetcuti, J.-B. Sortais, V. Ritleng

[16] Iron catalyzed hydrosilylation of esters
D. Bézier, G. T. Venkanna, L. C. Misal Castro, J. Zheng, T. Roisnel, J.-B. Sortais, C. Darcel,

H. Jaafar, H. Li, L. C. Misal Castro, J. Zheng, T. Roisnel, V. Dorcet, J.-B. Sortais, C. Darcel,

[18] Selective switchable iron-catalyzed hydrosilylation of carboxylic acids

[19] A convenient nickel-catalysed hydrosilylation of carbonyl derivatives

[20] Cyclometallation of arylimines and nitrogen-containing heterocycles via room-temperature C-H bond activation with arene ruthenium(II) acetate complexes

[21] Ruthenium(II) catalysed synthesis of unsaturated oxazolines via arene C-H bond alkenylation

[22] Hydrosilylation of imines catalysed by NHC-Nickel catalysts

[23] Cobalt carbonyl based catalyst for hydrosilylation of carboxamides

[24] Selective reduction of carboxylic acids to aldehydes through manganese catalysed hydrosilylation

[25] (Cyclopentadienyl)iron(II) Complexes of N-Heterocyclic Carbenes Bearing a Malonate or Imidate Backbone: Synthesis, Structure, and Catalytic Potential in Hydrosilylation

[26] Synthesis of new iron-NHC complexes as catalysts for hydrosilylation reactions
[27] Nickel-Catalysed Reductive Amination with Hydrosilanes

[28] Selective Reduction of Esters to Aldehydes under the Catalysis of Well-Defined NHC-Iron Complexes

[29] Unexpected Selectivity in Ruthenium-Catalyzed Hydrosilylation of Primary Amides: Synthesis of secondary amines

[30] N-Heterocyclic Carbene Ligands and Iron: An Effective Association for Catalysis

[31] Chiral Cyclopentadienyl type ligands: a New Breakthrough for Asymmetric C-H Functionalization

[32] A Convenient Nickel-Catalyzed Hydrosilylation of Carbonyl Derivatives using PMHS as the hydrosilane

[33] Methylation of Secondary Amines Catalysed by N-Heterocyclic Carbene Piano-Stool Iron Complexes

[34] Iron-catalysed tandem isomerisation/hydrosilylation reaction of allylic alcohols with amines
H. Li, M. Achard, C. Bruneau, J.-B. Sortais, C. Darcel, RSC Advances 2014, 4, 25892.

[35] Imidazolidinium ferrate complexes: Synthesis and catalytic properties

[36] Cationic Iron(II) Complexes of the Mixed Cyclopentadienyl (Cp) and the N-Heterocyclic Carbene (NHC) Ligands as Effective Precatalysts for the Hydrosilylation of Carbonyl Compounds

[37] $^{3}C$–H bond alkylation of ketones with alkenes via ruthenium(II) catalysed dehydrogenation of alcohols

[38] (NHC)Fe(CO)$_4$ efficient pre-catalyst for selective hydroboration of alkenes.

[39] Hydrosilylation of Aldehydes and Ketones Catalyzed by Half-Sandwich Mn(I) N-Heterocyclic Carbene Complexes
[40] Sequential ruthenium(II)-acetate catalyzed C-H bond diarylation in NMP or water and hydrosilylation of imines

[41] Ruthenium(II)-catalysed functionalisation of C-H bonds via a six-membered cyclometallate: monoarylation of aryl 2-pyridyl ketones

[42] Cycloruthenation of aryl imines and N-heteroaryl benzenes via C-H bond activation with Ru(II) and acetate partners

[43] Nickel Complexes of 1,2,4-Triazole Derived Amido-functionalized N-heterocyclic Carbene Ligands: Synthesis, Theoretical Studies and Catalytic Application

[44] When iron met phosphines: a happy marriage for reduction catalysis
L. C. Misal Castro, H. Li, J. B. Sortais, C. Darcel, Green Chem. 2015, 17, 2283-2303. (critical review)

[45] Iron-catalysed Cross Dehydrogenative Coupling (CDC) reactions; Editeur: C.-J. Li, RSC Publishing, "C-H to C-C bonds: Cross Dehydrogenative Coupling"

C. Darcel, J.-B. Sortais (Book chapter)

[47] Iron Catalyzed C-H Borylation of Arenes

Recent publications of J.-B Sortais

[1] Cyclometalated Complexes of Ruthenium, Rhodium and Iridium as Catalysts for Transfer Hydrogenation of Ketones and Imines.

T. Voss, Jean-Baptiste Sortais, R. Frohlich, G. Kehr, G. Erker, Organometallics 2011, 30, 584-594


ANR :

IRONHYC (2012-2015) (C. Darcel and J.-B. Sortais)
Partner : Dr. Sylviane Sabo-Etienne, Dr. Sébastien Bontemps, LCC Toulouse
« Iron hydride complexes »
Topic : Polyhydride IRON complexes and HYdrofunctionalized Catalysis

METCHIRPHOS (2008-2011) (C. Darcel)
Leader of the project: S. Jugé, University of Bourgogne
Partners: Univ. of Bourgogne, Univ. Strasbourg, Univ. Toulouse, Univ. Orleans.
Topic : Synthesis and use of P-chirogenic metallophosphide boranes - Applications in organometallic catalysis and organocatalysis"

Academic collaborations:

Dr. Sylviane Sabo-Etienne, Dr. Sébastien Bontemps, LCC Toulouse, France
ANR project « Ironhyc »
Recent paper on this topic: J. Am. Chem. Soc. 2015, 137, 4062.

Pr. Ismaël Ozdemir, (Université de Malatya, Turkey) - Bilateral Program CNRS-TUBITAK then bilateral PHC Bosphore project (2014-2015)
« Synthesis and catalytic properties of iron complexes bearing original N-heterocyclic carbene ligands (2011-2013)
Recent paper on this topic Appl. Organom. Chem. 2013, 27, 459

Pr. M. Chetcuti, Dr. Vincent Ritleng, Université de Strasbourg,
« Nickel-NHC complexes in hydrosilylation reaction »

Dr. Vincent César, Dr. Guy Lavigne, LCC Toulouse
Iron NHC complexes in catalysis

Prof. Prasenjit Ghosh, ITT Monbai, Bombay, India - CEFIPRA Project (2011-2014) - Iron and nickel NHC complexes in catalysis

Dr. Beatriz Royo - Bilateral PHC Pessoa project (2014-2015)

Prof. Matthias Beller, LIKAT Rostock, Germany - LIA ChemSusCat Rennes-Rostock -
Iron catalyzed reductions
Financial partners
MEMBERS:

Pr. Christophe Darcel

Dr. Jean-Baptiste Sortais (associate professor position)

Chaire d'excellence CNRS-UR1 (2009-2014)

Thomas DOMBRAY (2012-2015) Post doctorate fellowship from the “Région Bretagne” on a CREATE project - Bio-ressources valorisation via hydrogenation and hydrosilylation catalyzed by well-defined Iron complexes - BIORICAT” Then ANR “Ironhyc”


Saravanakumar ELANGOVAN (2013-2016) - PhD student “Iron-catalyzed reduction reaction”

Co-tutella with Matthias Beller (LIKAT Rostock, Germany)

Britany council fellowship ARED

Shi JIANG (2013-2015) - International Master 2 student - Iron catalysed hydroboration reactions

Publication: *J. Am. Chem. Soc.* 2015, 137, 4062;

Wei DUO (2014-2016) - International Master 2 student - Iron catalysed hydroborylation

Dilek (2014-2015) - Visiting PhD student from Ismail Ozdemir group, Inonu University, Malatya, Turkey, Tubitak fellowship

Kevin Monnier Licence 3 student (spring 2015)

Rita Lopez, Visiting PhD student (ITQB Liboa, Portugal) - Pessoa project with Beatriz Royo (spring 2015)
**FORMER STUDENTS and COLLABORATORS:**

**ATER, Post-Doc and PhD students**

**David Bezier** (2008-2011) – PhD student - "Réactions d'hydratation et d'hydrosilylation catalysées par le fer"

**Luis Misal** (2009-2012) – PhD student "Iron-catalyzed hydrosilylation reactions"

**PhD defense Jury – Friday November, 18th, 2011**


David joins Pr. Maurice Brookhart’s group in Chapell Hill (USA) for a post-doctoral stay.

**Luis Misal** (2009-2012) – PhD student "Iron-catalyzed hydrosilylation reactions"

Grant from the “French foreign office minister” and the venezuelian foundation “Gran Mariscal de Ayacucho”


Bin Li (2010-2013) – PhD student “Ruthenium and Iron-catalyzed C-H activation” in collaboration with P.H Dixneuf

Grant from the Chinese Scholarhip Council


Bin Li is currently associate professor in Wuyi University, Guangdong, China

Jianxia ZHENG (2011-2014) PhD student – Iron catalyzed reactions

Axa Fundation Grant


Jianxia obtained the Pierre Gineste Prize 2014 (best PhD in chemistry - University of Rennes 1)
She also obtained the 2014 Chinese Government Award for Outstanding Self-financed Students Abroad.
Jianxia is currently working in Evonik company in Shanghai, China.


CEFIPRA (Indo-french center for the promotion of advanced research)

grant

Hassen JAAFAR (2011-2013) Post doctorate fellowship from the “Région Bretagne” on a CREATE project - Bio-ressources valorisation via hydrogenation and hydrosilylation catalyzed by well-defined Iron complexes - BIORICAT”

Hassen is now assistant professor in Tunis.


**Dr. Sayed Ali Elatrees Solyman Drweesh** (Visiting assistant professor - October- December 2012)

**Christine Salomon** (co-tutella PhD thesis, Sherbrooke Univ., Canada,) In Dijon (in collaboration with Pr. Sylvain Jugé)

Synthesis and applications of chiral clusters for asymmetric catalysis and electrocatalysis

Christine is actually in Post doctoral position in Toulouse.


**Dr. Chloé Vovard-Le Bray** (ATER position, 2008-2009)

Lazar Bechki (December 2007 - March 2009 - Co-tutella with Algeria, collaboration with Pr. P.H. Dixneuf)

Lazhar is actually assistant professor in the University of Ourgla (Algeria)

Dr. Fanny Chaux (February 2009) - Post-doc

Fanny is actually Research Engineer in Pacmub platform in ICMUB research center In Dijon.

Dr. Venkana GOPALADASU T. (2010-2011) Post doctorate fellowship from the "Université de Rennes 1"

**Master students**


M. Wu in Paris  Master ceremony 2008  Master Ceremony 2009


Xiaofeng is currently professor in Zhejiang University, China and group leader in Beller’s group in Rostock. He did his PhD (2009-2011) in M. Beller’s group.

**David Bézier** (2007-2008) (Master 2 Chimie Moléculaire)

Master Ceremony with Pr. Grubbs, July 2008


David is currently in Post-doc with Pr. Brookhart, Chapell Hill, USA

**Charles Beromeo BHETEER** (2009-2010) international master student – Iron-ruthenium cascade catalyzed transformation

Master ceremony 2010


Charles is currently in post-doc in M. Beller’s group in Rostock. He did a PhD with Henri Doucet in the University of Rennes 1 (2010-2013)
Fan JIANG (2009-2011) international master student - Iron-catalyzed reduction reaction


Fan is currently working at Solvay, Shanghai. She was student in Christian Bruneau's group for a PhD position in the University of Rennes 1 (2011-2014)

Jianxia ZHENG (2010-2011) international master student - Iron catalyzed hydrosilylation


Jianxia is currently working at Evonik, Shanghai. She did a PhD with J.B. Sortais and C. Darcel in Rennes

Karthik DEVARAJ (2011-2012) international master student - Ruthenium C-H activation (in collaboration with Pr. P.H. Dixneuf)


Karthik is now in Sweden in PhD with Pr. Pilarski, Uppsala University.
Haoquan LI (2011-2013) international master student - Iron-catalyzed reduction reactions

Grant from the Foundation Rennes 1
Haoquan is now in Germany in PhD with Pr. Beller, LIKAT Rostock

Samuel QUINTERO DUQUE (2012-2014) international master student - Iron well defined complexes and catalyzed reduction reactions

Grant from the Foundation Rennes 1
Samuel is now in Germany in PhD with Dr. Ivana Fleischer, Regensburg University

Saravanakumar ELANGOVAN (2012-2013) international master student - Nickel-catalyzed reduction reactions

Saravana is now in PhD, cotutella between Rennes (C. Darcel, J.-B. Sortais) and Rostock (M. Beller)
**Fanny Hubert** (May-June 2012) - Chemistry Licence student - Nickel-catalyzed reduction reactions

**Florian CHOTARD** (May-June 2011) Chemistry Licence student

After a Master 2 in Rennes, Florian is currently PhD student in Dijon with P. Le Gendre and M. Picquet

**Elodie GUIHEUX** (May-June 2009) - Chemistry Licence student - Iron-catalyzed synthesis of sulfonylketimines and arylammines

Elodie is actually in Master 2 “Molecular Chemistry” in the University of Rennes 1.

**Aurore Gandubert** (May-July 2008) Chemistry Licence student

Aurore is actually student in Stéphane Cordier’s group for a PhD position in the University of Rennes 1.
FORMER STUDENTS in Dijon:

PhD students from the University of Bourgogne

Hugo Lauréano (PhD defense: December, 18th 2008)
"New synthetic methodologies for P-chirogenic organophosphorus ligands and chiral catalysts for fine chemistry"
Hugo is now working in Synthelor Company in Nancy.

Dr. Marie-Laure Auclair (PhD defense: November, 18th, 2004)
Synthesis and application of P-chirogenic palladacycles.
Marie-laure is working in a company in Mulhouse.

Dr. Gérald Morata (PhD defense: December, 1st, 2005)
Enantioselective synthesis of P-chirogenic phosphine-amine ligands.
Gérald is currently working in Sigma-Aldrich company.

Dr. Amélie Chamois (PhD defense: October, 8th, 2007)
Dérivés organométalliques d’aminoacides β-phosphorés : vers des marqueurs électrodéetectables.
Master Students

Actually Sales Engineer, Süd-Chemie AG, München (Germany)


Dr. Amélie Chamois (2003-2004) (PhD thesis)

FORMER STUDENTS in Cergy-Pontoise

PhD Students from the University of Cergy-Pontoise

Dr. Dominique Moulin (PhD defense: december, 15th, 1999)
Stereocontrolled synthesis of P-chirogenic organophosphorus ligands using highly enantiomerically pure chlorophosphine boranes. Application in catalyzed asymmetric hydrogenation.
Dominique is actually a leading manager in BASF - Ludwigshafen, Germany
Dr. Christophe Bauduin (PhD defense: November 27th, 2001)

Synthèse asymétrique de monophosphines encombrées et de nouveaux ligands P-chirogéniques. Application en catalyse asymétrique.

Christophe is actually a leading manager in BASF - Ludwigshafen, Germany

**Master Students**

Dr. Christophe Bauduin (1997-1998) (BASF, Ludwigshafen, Germany)
