Master's degree programmes in Chemistry, Chemical and Bioengineering

Research areas for research projects and Master's theses

The present document lists the research areas available for research projects and Master's theses in the MSc programmes in Chemistry, Chemical and Bioengineering.

The «Study Regulations» for these two Master's degree programmes define the subject areas, or departments/institutes, in which research projects and Master's theses can be carried out differently. Therefore, some of the research areas listed here may not be available to all programmes. For specific information and instructions, please consult the «Directives for research projects» or the «Directives for the Master's thesis», respectively, accessible on the same website as this list.

There is no guarantee for completeness of the present document, especially in the area of compulsory elective subjects. It is intended to assist students in making their choice of a research area for projects and Master's theses. Additional and more detailed information may be found on the websites of the research groups. The topic of the project or Master's thesis is determined by arrangement with the supervisor.

Every professor of D-CHAB can be chosen as a supervisor, if their research field lies within the respective subject area of the study program.

Prof. Dr. Athina Anastasaki

Laboratory of Polymeric Materials HCI G523/ Tel. 044 633 70 89
Contact: Athina.Anastasaki@mat.ethz.ch

Research areas:

- Synthetic Polymer Chemistry (synthesis of polymers mainly in the area of controlled radical polymerization)
- Polymer Self-Assembly (synthesis of polymers that self-assemble into spheres, worms, vesicles and other morphologies mainly through emulsion polymerizations)
- Polymer Sustanaibility (development of depolymerizations strategies with the aim to regenerate the starting materials and re-use them for a subsequent application)

Prof. Dr. Paolo Arosio

Institute for Chemical and Bioengineering, HCI E 135 / Tel. 044 633 94 40
Contact: paolo.arosio@chem.ethz.ch - https://arosiogroup.ethz.ch/

Research areas:

- Mechanisms and kinetics of protein aggregation
- Formulation of therapeutic proteins and antibodies
- Microfluidics for high-throughput analysis of product quality in bioprocessing
- Formation of amyloid fibrils and molecular mechanisms of disease

Prof. Dr. Alexander Barnes

Laboratory of Physical Chemistry, HCI D 225/ Tel. 044 633 93 80
Contact: alexander.barnes@phys.chem.ethz.ch - https://barnesgroup.ethz.ch/

Research areas:

- In-cell NMR, solid-state NMR of bryostatin, and DNP-NMR of membrane proteins
- Frequency-agile gyrotrons as microwave sources for DNP-NMR
- Magic angle spinning spheres
- Cryogenic MAS-NMR and DNP probe technology
- Electron decoupling and DNP method development

Prof. Dr. Máté Bezdek

Laboratory of Inorganic Chemistry, HCI H 117/ Tel. +41 44 633 48 21
Contact: mbezdek@ethz.ch

Research areas:

- Organometallic chemistry and catalysis for energy storage
- Carbon nanomaterial-metal complex hybrids including carbon nanotubes and fullerenes
- Stimuli-responsive metallopolymers
- Molecular approaches to chemical sensors for environmental health monitoring

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Prof. Dr. Jeffrey W. Bode

Laboratory of Organic Chemistry, HCI F 315 / Tel. 044 633 21 03
Contact: bode@org.chem.ethz.ch – www.bode.ethz.ch
Assistant: Mr. Mario Kessinger, kessinger@org.chem.ethz.ch / Tel. 044 633 31 21

Research areas:

- Invention and development of new organic reactions
- New reactions for the synthesis and modifications of peptides and proteins
- Synthesis, study, and application of shapeshifting molecules
- Design and synthesis of chiral catalysts for enantioselective transformations
- Novel molecular probes for non-invasive diagnosis

Prof. Dr. Erick M. Carreira

Laboratory of Organic Chemistry, HCI H 335 / Tel. 044 632 28 30
Contact: carreira@org.chem.ethz.ch – www.carreira.ethz.ch

Research areas:

- Synthesis of Bioactive Natural Products of Relevance to Human Medicine
- Synthetic and Chemical Biology Studies Aimed at Elucidating Interspecies Communication in the Human Microbiome
- Chemistry and Biology of Human-derived Natural Products
- Photopharmacology: Photoswitchable (ON/Off) Cannabinoids
- Design and Study of CB1/CB2 Selective Probes
- Discovery and Design of Catalysts for Asymmetric Synthesis
- Design and Study of Green Processes for the Preparation of Novel Building Blocks to Pharmaceuticals
- Design and Synthesis of Chemoproteomic Reagents for Cell Surface Capturing Techniques
- Catalysis with Iridium/Rhodium/Cobalt
- Design and Implementation of Synthesis Routes to Complex Secondary Metabolites: Discovery of Novel Strategies and Reactions

Prof. Dr. Peter Chen

Laboratory of Organic Chemistry, HCI G 209 / Tel. 044 632 28 98
Contact: peter.chen@org.chem.ethz.ch – www.chen.ethz.ch

Research areas:

- Reactive Intermediates and Reaction Mechanisms, Physical Organic Chemistry, Structure-Activity Relationships
- Homogeneous Catalysis with Organometallic Complexes, Specifically Metathesis, C-H Activation, Coordination Polymerization, Transmetalation, and Cyclopropanation
- Quantum Chemical Calculations on Reactive Intermediates, Validation of DFT methods
- Electrospray Ionization Tandem Mass Spectrometry for Thermochemical and Kinetic Characterization of Reactive Intermediates
- Laser Photodissociation Dynamics of Hydrocarbon Radicals, Stochastic and Nonstochastic Processes
- Laser Spectroscopy of Hydrocarbon Radicals, Combustion Intermediates

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Prof. Dr. Tae-Lim Choi

Laboratory of Polymer Chemistry HCI H517/ Tel. 044 633 6490
Contact: tlc@ethz.ch – tlc.snu.ac.kr & polychem.mat.ethz.ch

Research areas:

- Synthetic Polymer Chemistry Developing New Polymerization methods (including new monomer design and their multi-step syntheses)
- Polymerization of Sugar Derivatives and their Degradation Studies
- Synthesis of New Conjugate Polymers and Understanding Their Mechanism (including novel transition-metal catalysis)
- Precision Self-Assembly of Conjugated Polymers to Prepare Semi-conducting Nanomaterials (including size and shape control)

Prof. Dr. Christophe Copéret

Laboratory of Inorganic Chemistry, HCI H 229 / Tel. 044 633 93 94
Contact: ccoperet@inorg.chem.ethz.ch – www.coperetgroup.ethz.ch

Research areas:

- Energy and environment
- Bio-sensing and microelectronics
- Molecular, Surface, interfacial and Material chemistry
- Organometallic chemistry (lanthanides, early and late transition-metals)
- Homogeneous and Heterogeneous catalysis
- Applied computational chemistry
- Physical characterization of solids (IR, solid-state NMR, UV-Vis spectroscopies)
- Dynamic Nuclear Polarization Surface Enhanced NMR spectroscopy

Prof. Dr. Andrew deMello

Institute for Chemical and Bioengineering; HCI F 115 / Tel. 044 633 66 10
Contact: andrew.demello@chem.ethz.ch, robert.wootton@chem.ethz.ch – www.demellogroup.ethz.ch

Research areas:

- Droplet-based microfluidic systems for high-throughput chemistry and biology
- Development of microfluidic systems for handling live organisms
- Microfluidic reactors for small molecule and nanomaterial synthesis
- Development of optical spectroscopies for small-volume detection
- Paper-based microfluidics for point-of-care diagnostics
- Microfluidic-based synthesis of covalent organic frameworks

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Prof. Dr. Matthias Ernst

Laboratory of Physical Chemistry, HCI D 227 / Tel. 044 632 43 66
Contact: maer@ethz.ch – www.nmr.ethz.ch/~maer/home.html

Research areas:

- Method development in solid-state NMR
- Decoupling and recoupling methods for fast MAS
- Theoretical description of solid-state NMR experiments
- NMR relaxation theory in solids
- Dissolution Dynamic Nuclear Polarisation: instrumentation, theory, and methods
- Hyperpolarization using Haupt effect

PD Dr. Lorenz Gubler

Laboratory of Physical Chemistry
Contact: gublerl@ethz.ch
Paul Scherrer Institut, Electrochemistry Laboratory, OLGA 119 / Tel. 056 310 26 73
Contact: lorenz.gubler@psi.ch

Research areas:

- Research on polymer electrolytes for electrochemical energy conversion devices, i.e., fuel cells, water electrolyzers, CO2 separation cells
- Development of next generation ion-conducting membranes for acidic and alkaline conditions
- Study of radical induced degradation phenomena using gamma-radiolysis
- Understanding of performance and durability limiting phenomena

Prof. Dr. Robert Grass

Institute for Chemical and Bioengineering, HCI E 111 / Tel. 044 633 63 34
Contact: robert.grass@chem.ethz.ch

Research areas:

- Applied materials chemistry
- Materials processing
- Nanoparticle synthesis
- Surface chemistry
- DNA engineering
- DNA data storage

Prof. Dr. Hansjörg Grützmacher

Laboratory of Inorganic Chemistry, HCI H 131 / Tel. 044 632 28 55
Contact: gruetzmacher@inorg.chem.ethz.ch / schoenberg@inorg.chem.ethz.ch – www.gruetzmacher.ethz.ch

Research areas:

- Taming Radicals: Radicals as ligands in organometallic complexes and coordination compounds and their reactivity.
- Olefins as steering ligands: Unusual low valent metal complexes and their application in catalysis.
- Metal-metal interactions: Specific ligand design for polynuclear complexes.
- Metal complexes as active sites in electrodes: Development of highly efficient fuel cells.
- Homogeneously catalyzed dehydrogenation reactions: Strategies for atom-economic conversions.
- Development of simple building blocks for organophosphorus compounds: Na(OCP) and other “funny” low–valent phosphorus compounds

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Prof. Dr. Gonzalo Guillén Gosálbez

Institute for Chemical and Bioengineering, HCI G135 / 044 633 40 84
Contact: gonzalo.guillen.gosalbez@chem.ethz.ch

Research areas:

- Chemical System Engineering

Prof. Dr. Detlef Günther

Laboratory of Inorganic Chemistry, HCI G 113 / Tel. 044 632 46 87
Contact: guenther@inorg.chem.ethz.ch – www.analytica.ethz.ch

Research areas:

Forschungsgruppe für *Spurenelement und Mikroanalytik*

- Element/Isotopenanalytik
- Festkörper-Mikroanalytik
- Nano- und Femtosekunden Laserabtrag
- Aerosoltransport/Transportsysteme
- Pulsed Glow Discharge-TOFMS

Prof. Dr. Juliane Hollender

Institute of Biogeochemistry and Pollutant Dynamics (IBP); Eawag BU E15 / Tel. 058 765 54 93
Contact: juliane.hollender@env.ethz.ch

Research areas:

- Development of analytical methods for organic contaminants
- Fate of organic compounds in natural and engineered aquatic systems
- Bioaccumulation and biotransformation of organic compounds
- Linking exposure and effects of organic contaminants

Prof. Dr. Philippe H. Hünenberger

Laboratory of Physical Chemistry / HCI G233 / Tel. 044 632 55 03
Contact: phil@igc.phys.chem.ethz.ch – www.csms.ethz.ch

Research areas:

- Development and implementation of new simulation methods and algorithms, including
  - force-field development
  - enhanced conformational sampling
  - boundary conditions
  - electrostatic interactions
  - free-energy calculations
- Computer simulation of liquids, liquid mixtures, ions and ionic systems
- Computer simulation of biomolecules (polypeptides, nucleic acids, lipids, carbohydrates)

Prof. Dr. Gunnar Jeschke

Laboratory of Physical Chemistry, HCI F 227 / Tel. 044 632 57 02
Contact: gjeschke@ethz.ch – www.epr.ethz.ch

Research areas:

- Development of EPR methods for structure determination on nanometer length scales, for the characterization of structural changes and for measuring small and moderate hyperfine couplings
- Ultra-wideband EPR spectroscopy with shaped pulses
- Dynamical decoupling of electron spins in a spectroscopic context
- Structure determination of biomacromolecules and their complexes, with an emphasis on partially disordered proteins and protein-RNA complexes
- Characterization of spatial and electronic structure of catalytically active paramagnetic metal centres

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Prof. Dr. Kjell Jorner

Institute for Chemical and Bioengineering, HCI E137 / Tel. 044 633 35 30
Contact: kjell.jorner@chem.ethz.ch

Research area:

- Digital Chemistry

Prof. Dr. Peter Kast

Laboratory of Organic Chemistry, HCI F 333 / Tel. 044 632 29 08
Contact: kast@org.chem.ethz.ch – www.kast.ethz.ch

Research areas:

- Evolutionary approaches to enzyme analysis and engineering
- Structure and function of chorismate mutases from pathogenic bacteria
- Robotic directed evolution of biocatalysts

Prof. Dr. Maksym V. Kovalenko

Laboratory of Inorganic Chemistry, HCI H 123 / Tel. 044 633 41 56
Contact: mvkovalenko@ethz.ch – www.lac.ethz.ch/kovalenkolab.html

Research areas:

- New methods for a synthesis of colloidal inorganic nanostructures with precise size-, shape- and compositional control
- Surface chemistry of nanomaterials: novel inorganic ligands and colloidal stabilization
- Self-assembled, long-range ordered nanocrystal superlattices
- Hybrid materials by co-assembling colloidal nanostructures and molecular species
- Novel materials for batteries
- Optical properties of semiconductor nanocrystals, including studies at a single photon level
- Fabrication and testing of light-emitting diodes that employ novel materials developed in the group
- Inorganic nanomaterials for solution-processed photovoltaics and thermoelectrics

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Prof. Dr. Kathrin Lang

Laboratory of Organic Chemistry, HCI F 339 / Tel. 044 633 43 84
Contact: kathrin.lang@org.chem.ethz.ch

Research areas:

- Chemical Biology

Prof. Dr. Jean-Christophe Leroux

Laboratory of Drug Formulation & Delivery
Institute of Pharmaceutical Sciences, HCI H 301 / Tel. 044 633 73 10
Contact: jleroux@ethz.ch – www.galenik.ethz.ch

Research areas:

- 3D-printing of drug eluting devices
- Synthesis of monomers and polymers for pharmaceutical applications
- Polymer and lipid-based therapeutics for the treatment of intoxications and calcification disorders
- Colloids for drug delivery applications

Prof. Dr. Thomas Lippert

Laboratory of Inorganic Chemistry and Paul Scherrer Institut, OFLB U110 / Tel. 056 310 40 76
Contact: thomas.lippert@psi.ch or lippertt@ethz.ch

Research areas:

- Thin film deposition by pulsed laser deposition and other methods
- Oxide thin films for renewable energy applications
- Analysis of the thin film deposition process
- Laser induced forward transfer of functional materials
- Thin film analysis and characterization

Prof. Dr. Marco Mazzotti

Separation Processes Laboratory
Institute of Process Engineering, D-MAVT / Tel. 044 632 24 56
Contact: marco.mazzotti@ipe.mavt.ethz.ch – www.ipe.ethz.ch

Research areas:

- Purification of bio-pharmaceuticals by preparative chromatography
- Production of micro-particles of drug and drug-polymer composites by crystallization and precipitation
- Carbon dioxide capture and storage to mitigate climate change

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Prof. Dr. Frédéric Merkt

Laboratory of Physical Chemistry, HCI E 215 / Tel. 044 632 43 67
Contact: merkt@xuv.phys.chem.ethz.ch – www.xuv.phys.chem.ethz.ch

Research areas:

- Chemistry at temperatures below 1 K
- High-resolution photoelectron spectroscopy
- Generation of narrow bandwidth VUV laser radiation
- High Rydberg states
- Molecule optics
- Spectroscopy of molecular cations

Prof. Dr. Bill Morandi

Institute for Organic Chemistry, HCI G 313 / Tel 044 633 21 76
Contact: bill.morandi@org.chem.ethz.ch – http://morandi.ethz.ch/

Research areas:

- Development of new catalytic reactions
- Mechanistic studies including kinetics and isolation of reactive intermediates
- New polymerization and depolymerization reactions
- Synthesis of medicinally relevant molecules
- Biomass valorization
- Site-selective catalysis
- Ligand and catalyst design
- Development of new metathesis reactions
- High throughput approaches to catalyst discovery and bimetallic catalysis

Prof. Dr. Victor Mougel

Laboratory for Inorganic Chemistry, HCI H 105, Tel 044 633 20 92
Contact: mougel@inorg.chem.ethz.ch / http://www.victor-mougel.eu/

Research areas:

- Small Molecule (N2, CO2, H2O) transformation
- Bio-inspired Molecules and Materials for Catalysis
- Electrocatalysis
- Coordination Chemistry
- Organometallic Chemistry

Prof. Dr. Javier Pérez-Ramírez

Institute for Chemical and Bioengineering, HCI E 125 / Tel. 044 633 71 20
Contact: jpr@chem.ethz.ch – www.perez-ramirez.ethz.ch

Research areas:

- Catalyst design for CO2 valorization into fuels and chemicals
- Catalysts design for natural gas upgrading using halogen chemistry
- Catalyst and process design for the sustainable manufacture of biochemicals
- Precision design of active single atomic centers or ensembles in heterogeneous catalysts.
- Advanced methods to assess complex pore architectures in hierarchically structured catalysts
- Design of metal compounds with controlled vacancy chemistry for selective hydrogenations

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Prof. Dr. Markus Reiher

Laboratory of Physical Chemistry, HCI G 229 / Tel 044 632 43 08
Contact: markus.reiher@phys.chem.ethz.ch – www.theochem.ethz.ch/research

Research areas:

- Relativistic Quantum Chemistry
- Theoretical Bio-Inorganic Chemistry and Coordination Chemistry
- Electron Correlation and Density Functional Theory
- Theoretical Spectroscopy
- Chemical Concepts and Foundations of Chemistry
- Real-time and haptic quantum chemistry
- Systems chemistry and uncertainty quantification

Prof. Dr. Jeremy O. Richardson

Laboratory of Physical Chemistry, HCI G 217 / Tel. 044 633 46 36
Contact: jeremy.richardson@phys.chem.ethz.ch -- www.richardson.ethz.ch

Research areas:

- Semiclassical path-integral description of quantum mechanics
- Quantum nuclear effects in chemical reactions
  Tunnelling dynamics in water clusters and other hydrogen-bonded molecular systems
- Development of new approaches for simulating nonadiabatic dynamics
- Electron-transfer theory

Prof. Dr. Roland Riek

Laboratory of Physical Chemistry, HCI F 225 / Tel. 044 632 61 39
Contact: roland.riek@phys.chem.ethz.ch – www.bionmr.ethz.ch

Research areas:

- Structure-function relationship of protein aggregation associated with diseases
- Membrane protein structures and dynamics
- Correlated motion in proteins
- Nuclear Magnetic Resonance (NMR) spectroscopy in the liquid phase
- Expression, purification and biophysical characterization of proteins
- On the origin of life

Prof. Dr. Sereina Riniker

Laboratory of Physical Chemistry, HCI G 225 / Tel. 044 633 42 39
Contact: sriniker@ethz.ch – www.riniker.ethz.ch/

Research areas:

- Molecular dynamics (MD) simulations of biological systems
- Method development for MD simulations and cheminformatics
    - Free energy calculation
    - Multi-resolution methods
    - Conformer generation
- Force-field development
- Conformational behavior of peptides

Prof. Dr. Roger Schibli

Laboratory of Radiopharmacy; Institute of Pharmaceutical Science HCI H 425 / Tel. 044 633 74 64
Contact: roger.schibli@pharma.ethz.ch

Research areas:

- Development of radiopharmaceuticals for diagnostic and therapeutic applications
- Radiometal labeling of peptides and proteins via chelators
- Organic synthesis of precursor for radiolabeling with 18F and 11C for PET imaging
- Development and engineering of targeting proteins for disease related application

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Prof. Dr. Thomas J. Schmidt

Laboratory of Physical Chemistry, HCI G 215 / Tel. 044 632 22 64
Contact: thomas.schmidt@phys.chem.ethz.ch
Paul Scherrer Institut, Electrochemistry Laboratory, OVGA 108 / Tel. 056 310 57 65
Contact: thomasjustus.schmidt@psi.ch

Research areas:

- Surface Electrochemistry, Electrochemical Surface Science and Electrocatalysis
- Development of advanced materials for Fuel Cells, Electrolyzers and Redox Flow Cells (Catalysts, membranes, porous media)
- Operando Diagnostics for Electrochemical Energy Devices (Fuel Cells, Electrolyzers, Redox Flow Cells)
- Materials for Redox Flow Batteries

Prof. Dr. Gisbert Schneider

Institute of Pharmaceutical Sciences, HCI H 411 / Tel. 044 633 73 27
Contact: gisbert.schneider@pharma.ethz.ch – www.cadd.ethz.ch

Research areas:

- Drug Design
- Peptide Design
- Synthesis and biophysical characterization of small molecules and peptides
- Machine learning, Software development
- Bio- / Cheminformatics

Prof. Dr. Chih-Jen Shih

Institute for Chemical and Bioengineering, HCI E 137 / Tel. 044 633 4240
Contact: chih-jen.shih@chem.ethz.ch – www.shihlab.ethz.ch

Research areas:

- Mesoscale Modeling
- Physics and Chemistry of Interfaces
- Nanomaterials Processing
- Nanomaterials-Based Devices

Prof. Dr. Ruth Signorell

Laboratory of Physical Chemistry, HCI F 205 / Tel. 044 633 46 21
Contact: rsignorell@ethz.ch – https://www1.ethz.ch/aerosol/

Research areas:

- Spectroscopy of nanoscale objects: Interaction of light with ultrafine aerosol particles and nanoparticles
- Development of new methods for the detection and characterization of ultrafine aerosol particles
- Confinement effects in extreme ultraviolet photoemission of ultrafine aerosols: Structure, surface and interface properties
- Optical trapping for the characterization and manipulation of single aerosol particles: Application to atmospheric aerosols, reactive processes, phase transitions
- Interaction of infrared radiation with dielectric nanoparticles: Application to atmospheric aerosols and multifunctional nanomedicine
- Formation of new aerosol particles: Nucleation from the gas phase

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Prof. Dr. Wendelin J. Stark

Functional Materials Laboratory, HCI E 107 / Tel. 044 632 09 80
Contact: wendelin.stark@chem.ethz.ch – www.fml.ethz.ch or S. Halim, samuel.halim@chem.ethz.ch

Research areas:

- Heterogene Katalyse
- Nachwachsende Rohstoffe
- Nanopartikelherstellung (Oxide, Salze, Metalle) über Flammensynthese
- Toxikologie von Nanopartikeln
- Biokomposite/Implantatmaterialien

Prof. Dr. Patrick Steinegger

Laboratory of Inorganic Chemistry, H 109 / Tel. 044 633 20 74
Contact: steinegger@inorg.chem.ethz.ch – www.psi.ch/en/lrc

Research areas:

- Development of fast chemical methods for the investigation of superheavy elements.
- Detectors for nuclear spectroscopy in harsh environments.
- Thermochemical characterization of radioelements.
- Release of radionuclides from molten metals.
- Innovative target preparation of exotic radionuclides (e.g., for nuclear physics measurements).
- Production and preparation of innovative radionuclides for radiopharmaceutical applications.

Prof. Dr. Shana J. Sturla

Laboratory of Toxicology, LFO D 15 / Tel. 044 632 91 75
Contact: sturlas@ethz.ch – www.toxicology.ethz.ch / http://www.toxicology.ethz.ch/education/education1.html

Research areas:

- Synthesis of bioactive small molecules and biomolecular adducts
- Study of chemical transformations catalyzed by the human gut microbiome
- Impact of biomolecular adducts on enyzme mechanisms in DNA replication, repair and transcription
- Mechanisms of mutagenesis and anticancer drug activity
- Fluorescence labeling of proteins and imaging
- Discovery and bioanalysis (i.e. mass spectrometry) of biomarkers for precision cancer therapy
- Creating in vitro (human cell) models for toxicity testing

Prof. Dr. Jeroen A. van Bokhoven

Institute for Chemistry and Bioengineering, HCI E 127 / Tel. 044 632 55 42
Contact: jeroen.vanbokhoven@chem.ethz.ch – www.vanbokhoven.ethz.ch

Research areas:

- Heterogeneous catalysis
- Precision synthesis (structural control of the active sites), structural characterization, and kinetic analysis of supported metals and metal oxides
- Asymmetric catalysis with heterogeneous catalysts
- Energy processes of the future
- High selectivity processes
- Structural analysis with advanced characterization methods (also using synchrotron radiation)

Prof. Dr. Helma Wennemers

Laboratory of Organic Chemistry, HCI H 313 / Tel 044 633 37 77
Contact: helma.wennemers@org.chem.ethz.ch – www.wennemers.ethz.ch

Research areas:

- Asymmetric catalysis with peptides and other bioinspired Molecules
- Design of collagen based materials
- Metal nanoparticles – Design of templates to control the size and shape of NPs
- Selective RNA targeting
- Supramolecular assemblies and selective intermolecular interactions
- Tumor targeting
- Cell penetrating peptides

Dr. Marc-Olivier Ebert. Contact: HCI D 317 / Tel. 044 633 47 26, ebert@org.chem.ethz.ch

Research areas:

- Structure determination of oligopeptides and oligonucleotides
- Investigation of molecular dynamics by NMR
- Structure elucidation of organic molecules
- NMR in anisotropic media (stretched gels, liquid crystals)
- NMR of paramagnetic molecules
- Synthesis of lanthanide tags

Dr. Josep Mas-Roselló. Contact: HCI H 314 / Tel. 044 633 41 81; josep.masrosello@org.chem.ethz.ch

Research areas:

- Homogeneous asymmetric catalysis
- Design and synthesis of multifunctional small-molecule catalysts
- Reaction and method development for organic synthesis
- Inert chemical bond activation (H-H, C-H, CO2, etc.)
- Investigation of reaction mechanisms
- Computational prediction of efficient catalysts

Prof. Dr. Hans Jakob Wörner

Laboratory of Physical Chemistry, HCI E 237 / Tel. 044 633 44 12
Contact: hansjakob.woerner@phys.chem.ethz.ch – www.atto.ethz.ch

Research areas:

- High-Harmonic Spectroscopy
- Attosecond Spectroscopy of Liquids and Solutes
- Attosecond Spectroscopy of Gases
- Time-Resolved Photoelectron Spectroscopy
- Time-Resolved X-ray Absorption Spectroscopy
- Measurement of an Isolated 43-Attosecond Soft-X-Ray-Pulse

Prof. Dr. Yoko Yamakoshi

Laboratory of Organic Chemistry, HCI F 323 / Tel. 044 633 64 20
Contact: yamakoshi@org.chem.ethz.ch – www.yamakoshi.ethz.ch

Research areas:

- Chemical functionalization of fullerenes (C60, C70, Gd3N@C80 etc.) for bioapplication (PDT and MRI) (collaboration with EPFL)
- AFM tip functionalization for single molecular recognition and nano-lithography (collaboration with D-MATL at ETH and PSI)
- Nanoparticle-based in vivo molecular imaging probes for selective diagnosis of diseases (collaboration with Department of Radiology at University of Pennsylvania)
- Detection and use of photoexcited fullerenes

Prof. Dr. Renato Zenobi

Laboratory of Organic Chemistry, HCI E 329 / Tel 044 632 43 76
Contact: zenobi@org.chem.ethz.ch – www.zenobi.ethz.ch

Research areas:

- Chemische Analytik und Spektroskopie auf der Nanometer-Skala
- Electrospray Ionisations – Massenspektrometrie: Quantitative Messungen nichtkovalenter Wechselwirkungen
- Electrospray Ionisations – Massenspektrometrie: Untersuchung des Spray-Prozesses
- MALDI – Massenspektrometrie an Systemen mit Molekulargewichten von > 100 kDa
- Fourier-Transform – Massenspektrometrie
- Single Cell Metabolomics