

## International Internship

- Start your first international research project
- Visit one of the world's top institutes in the fields of molecular sciences, spectroscopy, and simulation
- Publish your first scientific paper together with internationally recognized top researchers
- Gain international experience at a very early stage in your career
- Earn leadership qualities in multicultural, interdisciplinary, high profile research teams
- Your internship will be organized and co-financed by the university

## Our excellent Research Network:

| Institution   | Institution   |
|---|---|
|  Cornell University, USA                        |  University of California Berkeley, USA          |
|  Ecole Normale Supérieure Paris, France         |  University of California Irvine, USA            |
|  ETH Zürich, Switzerland                        |  University of California Los Angeles, USA       |
|  Indian Institute of Science Bangalore, India   |  University of California Santa Barbara, USA     |
|  Indian Institute of Technology Kanpur, India   |  University of Cambridge, UK                     |
|  National Institutes of Natural Sciences, Japan |  University of Illinois at Urbana Champaign, USA |
|  Purdue University, USA                        |  University of Nottingham, UK                   |
|  University of Pennsylvania, USA              |  Seoul National University, Korea              |
|  Radboud University Nijmegen, The Netherlands |  Weizmann Institute of Science, Israel         |
|  University College London, UK                |  University of Vienna                          |
|  Yale University, USA                         |   |

RUHR-UNIVERSITÄT BOCHUM  
FACULTY OF CHEMISTRY AND BIOCHEMISTRY

International Master Program  
Molecular Sciences - Spectroscopy and Simulation  
Building ZEMOS 2.09 | Universitätsstraße 150 | D-44801 Bochum  
Fon +49 (0)234 32-26276 | E-mail imos@rub.de  
www.rub.de/imos

## UA Ruhr

### University Alliance Ruhr

- 110,000 students
- 15,000 international students
- 8,000 researchers
- Universities: Bochum, Dortmund, and Duisburg-Essen
- 800 partnerships with universities in 130 countries
- Annual budget over 1.1 billion euros



### Bochum in the Heart of Metropolis Ruhr

- Modern cultural, scientific, and technological area
- High standard of living
- Eleven metropolitan cities
- 5.2 million people
- 20 universities
- Enjoy thousands of leisure activities like festivals, concerts, and sports.

### Ruhr-Universität Bochum

The Ruhr-Universität Bochum is one of Germany's leading research universities. It draws its strengths from both the diversity and the proximity of many different scientific disciplines on a single, coherent campus. This highly dynamic setting enables students and researchers to work across traditional boundaries of academic subjects and faculties. The Ruhr-Universität is a vital institution in the Metropolis Ruhr and hosts about 34,000 students and about 4,700 staff.



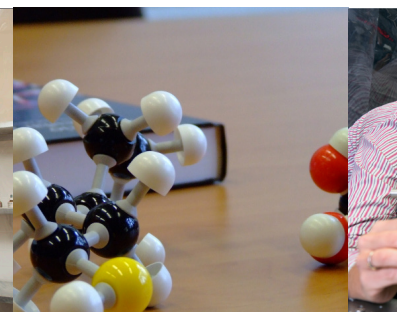
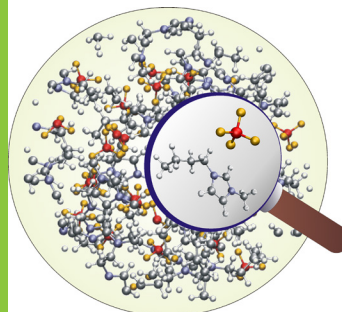
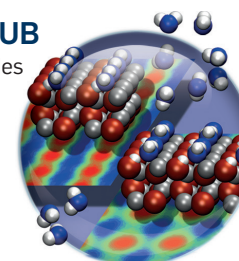
### Main Destinations close by

- Düsseldorf 0.5 hours
- Cologne 1 hour
- Berlin 4 hours
- Amsterdam 3 hours
- Brussels 3 hours
- Luxembourg 3 hours
- Paris 6 hours
- Prague 7 hours
- North Sea 3 hours

### Solvation Science @ RUB

Solvation Science @ RUB provides a unifying framework for understanding and predicting solvent processes at Ruhr-Universität Bochum:

www.solvation.de



RUHR-UNIVERSITÄT BOCHUM

50 Jahre

RUB



## International Master's Program

## Molecular Sciences - Spectroscopy and Simulation

Faculty of Chemistry and Biochemistry  
Solvation Science @ RUB  
University Alliance Ruhr

www.rub.de/imos





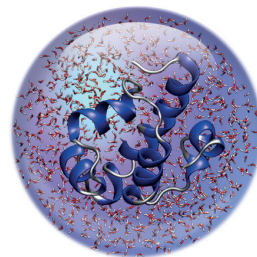
## iMOS

### International Master Molecular Sciences

iMOS offers you the unique chance to acquire and to apply in practice cutting-edge skills in theoretical and spectroscopic techniques in the fields of molecular chemistry, biochemistry, and physics.

#### Get ready:

- The Master's Program takes two years
- The teaching language is English
- Study within a very active, interdisciplinary research environment
- Work together with top researchers in their field
- Early hands-on experience in high profile research
- Spend three months on an international internship
- Qualify for your funded doctoral thesis in Germany
- Fast Track Option for outstanding students: Start your doctoral work after only one year



#### Apply now:

- Online application: [www.ruhr-uni-bochum.de/imos](http://www.ruhr-uni-bochum.de/imos)
- Submit your academic certificates
- If you are not a native speaker, file your English language certificate
- **DEADLINE FOR APPLICATION: JULY 31<sup>st</sup>**
- Talk to us in a skype introductory conversation
- Get your visa
- Course start: October

#### Who should apply?

Bachelor students in

- Chemistry
- Physics
- Mathematics
- Bio-Chemistry
- related Engineering fields

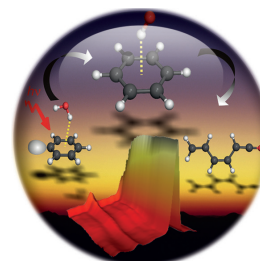


We are looking for students who have a passion for science and wish to work in an international environment.

#### What skills should you have?

This is a highly competitive program relying on your skills in quantum mechanics, mathematics, physics, and chemistry. You should have already learned:

- Schrödinger's equation and wave functions
- Hamilton operator
- real and complex valued vector spaces, matrices
- basis set transformations, partial differentiation
- integration over arbitrary dimensional space
- basic statistical entities like distributions, averages data regression and hypothesis tests.



Basic knowledge of concepts of classical mechanics and thermodynamics/statistical mechanics is mandatory.



#### What we offer:

- Comprehensive student support
- Guaranteed housing
- Full-time student benefits
- German and English language courses
- Three-month international internship
- 2nd year: opportunity to apply for paid scientific student jobs
- Possibility to start a paid Ph.D. study after Master
- Active research environment with internationally renowned scientists
- Full assistance in study and research

#### iMOS Scope

- Earn cutting-edge skills in theoretical and spectroscopic techniques
- Gain deep insights into molecular physics, chemistry, and bio-chemistry
- Acquire the ability to apply the tools to a wide range of interdisciplinary scientific challenges
- Learn how to develop and solve scientific questions by employing suitable theoretical and experimental methods
- Work in international, multicultural, and interdisciplinary teams

#### iMOS Curriculum (120 CPs\*)

##### 1<sup>st</sup> Semester (28 or 33 CPs)

- Concepts of Quantum Mechanics\*\*
- Statistical Physics and Thermodynamics\*\*
- Dynamics and Simulation (+ Practical)
- Concepts of Spectroscopy 1 (+ Practical)
- Concepts of Molecular Chemistry 1
- Biomolecular Simulation\*\*

##### 2<sup>nd</sup> Semester (28 or 33 CPs)

- Electronic and Molecular Structure Theory (+ Practical)
- Concepts of Spectroscopy 2 (+ Practical)
- Theoretical Spectroscopy
- Concepts of Molecular Chemistry 2\*\*
- Methods of Structural Analysis\*\*
- Fundamentals of Magnetic Resonance\*\*
- Scientific Programming Methods for Chemists\*\*

##### 3<sup>rd</sup> Semester (29 CPs)

- Hands-on training in a research group of your choice
- International Course (three-month internship)

##### 4<sup>th</sup> Semester (30 CPs)

- Master's Thesis

\*: CPs means credit points

\*\* : Three of seven elective courses are required for graduation.

#### Work Perspectives

Germany is one of the world's leaders in applied optical technologies, chemistry and pharmacy. There exist excellent opportunities for alumni with a top-level education and training in spectroscopy and microscopy, as well as simulation techniques.

