

## IRES: Training next generation U.S. researchers in advanced magnetic resonance at the chemistry-industry interfaces

Would you like to immerse yourself into an international scientific community during your PhD? Are you interested in interdisciplinary education with intercultural experiences? Would you like to better understand the relationship between academia and industry? Then you might want to consider becoming an IRES Fellow and broadening your educational experience!



Images (from left): RWTH at night, Magnetic resonance facility, RWTH in the historic city of Aachen

**Application.** PhD students in the Chemical Science and Engineering in the early stages (typically first or second year) at UCSB, UCB and UCLA are encouraged to apply to become IRES Fellows. You will perform research in your first summer at the RWTH Aachen University in Germany on the topics, and at the interface, of catalysis, chemical transformation, modeling and magnetic resonance characterization. Your research stay will be framed with several workshops on sustainable chemistry and chemistry at the academia-industry interface, while as IRES fellows you will participate in the annual SusTech workshop taking place at UCSB. You will receive a summer stipend of \$5500, while your travel expenses and accommodation covered. Our RWTH partners will organize finding the accommodation for the IRES fellows in Aachen. Applications open October 15, 2017 and close on December 11, 2017.

**Scope.** Our goal is to train a cohort of early-stage chemistry and chemical engineering graduate students to the connecting M<sup>3</sup> cycle consisting of synthesis (Make), innovative measurements (Measure) and system modeling or sustainable operation (Model) in the context of applied chemistry in Germany. This M<sup>3</sup> cycle is critically important in modern chemistry as it represents an effective way to achieve rapid advances in chemical synthesis and the understanding of chemical transformations, yet this cycle is not broadly implemented in the U.S. chemical science curriculum. The proposed educational excursion will train students to better understand the interrelationship between academia and industry, as well as intercultural differences that they will encounter in a global economy.

**UC-RWTH Partnership.** Expert groups in advanced magnetic resonance at UCSB, UC Berkeley, UCLA and the RWTH Aachen University in Germany joined together to pool their advanced analytical tools to work on integrated problem-solving in a three-way M<sup>3</sup> cycle, in synergistic collaboration with chemistry and engineering colleagues to concentrate their efforts on the training of a cohort of graduate students. Several research groups at the RWTH Aachen University are ideal partners to pursue this educational endeavor, not only because the RWTH is ranked #1 in forging chemistry-engineering partnerships, but also because there are strong existing multi-PI collaborations between the UCLA/UCSB/UCB and RWTH PIs that the IRES fellows can immerse themselves in. Email: [ires@chem.ucsb.edu](mailto:ires@chem.ucsb.edu) in order to inquire about available project data bank for potential UCLA/UCSB/UCB and RWTH collaborations.

**IRES-Program.** A cohort of 6 graduate students per year will be selected (from three different campuses) and recruited in the early years of their doctoral studies, with the goal to integrate their research and training in the M<sup>3</sup> cycle throughout their graduate career with leveraging support and collaborations. These select students will be prepared pre-departure with weekly online sessions on the German language and culture in Spring. The IRES cohort will gather at UCSB for an orientation workshop in Spring, ahead of their travel to Aachen in the summer following their accepted application. The expected outcome is that the graduate students have gained hands-on experience on how to accelerate the *discovery and triaging* of chemical, materials and system parameters and how to *design reaction pathways* given a set of starting chemicals. This learning process and evolution will be shared at an annual workshop involving current and past IRES fellows and their professional connection within the cohort and the collaborators maintained through social media.

### Application and Event Calendar

Application Window: October 15, 2017 – December 11, 2017

Selection Criteria: Collaboration between faculty, applicant quality and motivation

Selection Date and Announcement: January 2018

SusTech Workshop: Early April 2018

Spring Info Sessions: Weekly online meetings during Spring quarter, between April 1 – June 15, 2018

Research stay abroad: June 16-August 13, 2018 at RWTH Aachen University. Activities include:

IRES kick-off workshop: June 18-19, 2018 at RWTH Aachen University, joint with the 5<sup>th</sup> annual workshop of the Aachen-California Network of Academic Exchange (ACalNet)

Weekly events: seminars, excursions to industries and historic sites

IRES concluding seminar: August 9, 2018 at RWTH Aachen University

### Application Material

The application package should include the following items in the listed order, within a single PDF file.

1. A 1-page cover letter in which the motivation and goals of the applicant for research abroad at the RWTH, in the context of his/her future career objectives, are succinctly stated.
2. A 2-page curriculum vitae (in quality and format that would qualify for a job application)
3. Two letters of agreement expressed in a short paragraph, 1 from the host faculty at the RWTH and 1 from the current or prospective advisor at UCSB, UCLA or UCB, supporting the applicant.
4. A written proposal of the research to be carried out at the RWTH, limited to no more than 3 pages (Arial, 11pt font, standard margins). The proposal should address the following questions: Title and goal of proposed research in one sentence. What specific research project do you propose to pursue at the RWTH? Have you connected to faculty and students at the RWTH? How does this project connect to your own PhD project back “home”? What are your broader goals?

Please submit applications within the application deadline (11.59 pm PST on Dec 11) to: [ires@chem.ucsb.edu](mailto:ires@chem.ucsb.edu).

### Before You Apply

The success of your application will hinge on the potential to forge RWTH-UC collaborations between groups. Thus, it is important to discuss your application with IRES faculty and identify RWTH host laboratories and faculty (see <http://www.acalnet.com/en/>). If you are interested in inquiring or applying, please contact [ires@chem.ucsb.edu](mailto:ires@chem.ucsb.edu) to access the project data bank in which exemplary projects at the RWTH-UC intersect are listed.



*Images (from left): Aachen cathedral at night, Charlemagne emperor*

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