

# Nobel Workshop

DAY 1

Organized by *The Royal Swedish Academy of Sciences*  
and the *Chalmers Life Science Engineering Area of Advance*

Date: Monday May 4<sup>th</sup>, 2015  
Topic: **MOLECULES IN LIFE SCIENCE RESEARCH**  
Chairs: Prof. Jens Nielsen and Prof. Andrew Ewing  
Venue: RunAn Conference Hall, Chalmers University of Technology,  
Chalmersplatsen 1, SE-412 58 Göteborg, Sweden

- 08:35-08:40 **Welcome note:** *Prof Karin Markides, Chalmers President*
- 08:40-08:45 **Opening note:** *Prof Jens Nielsen, Director of Life Science Engineering*
- 08:45-09:25 Prof **DAVID LILLEY**, University of Dundee, United Kingdom  
*How does RNA act like an enzyme*
- 09:25-10:05 Prof **PETER von HIPPEL**, University of Oregon, United States  
*The multiple roles of the non-(sequence)-specific binding of genome-regulatory proteins to DNA in vitro and in vivo.*
- 10:05-10:35 **Coffee break**
- 10:35-11:15 Prof **JENS NIELSEN**, Chalmers University of Technology, Sweden  
*Metagenome analysis of the human gut microbiome*
- 11:15-11:55 Prof **TOSHIO YANAGIDA**, Osaka University, Japan  
*Role of fluctuations for driving bio-molecular machines*
- 11:55-12:55 **Lunch break**
- 12:55-13:35 Nobel Laureate **ARIEH WARSHEL**, University of Southern California, United States  
*Evaluating and using free energy landscapes for biological functions*
- 13:35-14:15 Nobel Laureate **MICHAEL LEVITT**, Stanford University, United States  
*Solving Large & Difficult Structures with Less Experimental Data*
- 14:15-14:55 Prof. **DINA PETRANOVIC**, Chalmers University of Technology, Sweden  
*Yeast as a model for human diseases*
- 14:55-15:25 **Coffee break**
- 15:25-16:05 Prof **RICHARD LERNER**, The Scripps Research Institute, United States  
*Selecting Antibodies from Combinatorial Libraries for the Treatment of Cancer*
- 16:05-16:45 Prof **ANDREW McCAMMON**, University of California, San Diego, United States  
*Molecular Dynamics and Drug discovery*
- 16:45-18:00 **Panel discussion: Opportunities and Challenges in Life Science Research**  
(Moderators: Jens Nielsen and Andrew Ewing)

# Nobel Workshop

DAY 2

Organized by *The Royal Swedish Academy of Sciences*  
and the Chalmers *Energy and Nanoscience and Nanotechnology Areas of Advance*

Date: Tuesday May 5<sup>th</sup>, 2015  
Topic: **MOLECULES IN NANO AND ENERGY RESEARCH**  
Chairs: Prof. Bo Albinsson and Dr. Anders Ådahl  
Venue: RunAn Conference Hall, Chalmers University of Technology,  
Chalmersplatsen 1, SE-412 58 Göteborg, Sweden

- 08:25-08:30 **Opening note:** Prof Bo Albinsson, Director of Nanoscience and Nanotechnology and Dr. Anders Ådahl, Director of Energy
- 08:30-09:10 Prof **HARRY GRAY**, California Institute of Technology, United States:  
*The Currents of Life: Electron Flow through Proteins*
- 09:10-09:50 Nobel Laureate **ROGER KORNBERG**, Stanford University, United States  
*Metal nanoparticles: atomic structures and applications in cryo-electron microscopy*
- 09:50-10:20 **Coffee break**
- 10:20-11:00 Prof **REIKO KURODA**, Tokyo University of Science, Japan  
*A twisting story: how a single gene twists a snail*
- 11:00-11:40 Prof **WAYNE HENDRICKSON**, Columbia University, United States  
*Distinctions and Shared Principles in Transmembrane Ion Channels*
- 11:40-12:20 Nobel Laureate **KURT WÜTHRICH**, The Scripps Research Institute, United States, and ETH Zürich, Switzerland.  
*Sunset of the NIH Protein Structure Initiative – What Next?*
- 12:20-13:20 **Lunch break**
- 13:20-14:00 Nobel Laureate **JEAN-MARIE LEHN**, University of Strasbourg, France  
*Towards adaptive chemistry*
- 14:00-14:40 Nobel Laureate **BARRY SHARPLESS**, The Scripps Research Institute, United States  
*Exploring the Sulfate World*
- 14:40-15:10 **Coffee break**
- 15:10-15:50 Prof **JOSEF MICHL**, University of Colorado at Boulder, United States, and Institute of Organic Chemistry and Biochemistry ASCR, Prague, Czech Republic  
*Unconventional solar energy – singlet fission*
- 15:50-16:30 Prof **Sir JOHN MEURIG THOMAS**, University of Cambridge, United Kingdom  
*Some of Tomorrow's Catalysts: Actual and Desired*
- 16:30-18:00 **Panel discussion: Opportunities and Challenges in Nanotechnology and Energy Research**  
(Moderators: Bo Albinsson and Anders Ådahl)

# Nobel Workshop

DAY 3

Organized by *The Royal Swedish Academy of Sciences*  
and the Chalmers *Materials Sciences Area of Advance*

Date: Wednesday May 6<sup>th</sup>, 2015  
Topic: **MOLECULES IN MATERIALS RESEARCH**  
Chairs: Prof. Aleksandar Matic and Prof. Fredrik Höök  
Venue: RunAn Conference Hall, Chalmers University of Technology,  
Chalmersplatsen 1, SE-412 58 Göteborg, Sweden

- 08:25-08:30 **Opening note:** Prof Aleksandar Matic, Director Materials Science
- 08:30-09:10 Nobel Laureate **STEFAN HELL**, University of Göttingen, Germany  
*Nanoscopy with focused light*
- 09:10-09:50 Nobel Laureate **WILLIAM E. MOERNER**, Stanford University, United States  
*Single-Molecule Spectroscopy, Blinking, and Photocontrol: Foundations for Super-Resolution Microscopy*
- 09:50-10:20 **Coffee break**
- 10:20-11:00 Prof **ROBERT LANGER**, Massachusetts Institute of Technology, United States  
*Advances in biomaterials and drug delivery*
- 11:00-11:40 Prof **TOM BROWN**, University of Oxford, United Kingdom  
*Extending the Boundaries of Nucleic Acid Chemistry*
- 11:40-12:20 Nobel Laureate **ANDREW FIRE**, Stanford University, United States  
*Taming opportunistic RNAs*
- 12:20-13:20 **Lunch break**
- 13:20-14:00 Prof **JAMES BARBER**, Imperial College London, United Kingdom  
*From natural to artificial photosynthesis for renewable fuels*
- 14:00-14:40 Prof **PAUL ALIVISATOS**, University of California Berkeley, United States  
*Nanocrystals as a fundamental building block of nanoscience and nanotechnologies*
- 14:40-15:20 Prof **YAHLI LORCH**, Stanford University, United States  
*Chromatin remodeling*
- 15:20-15:50 **Coffee break**
- 15:50-16:30 Dr **RICHARD HENDERSON**, MRC LMB, Cambridge, United Kingdom  
*Structure of membrane proteins involved in signal transduction*
- 16:30-18:00 **Panel discussion: Opportunities and Challenges in Materials Research**  
(Moderators: Aleksandar Matic and Fredrik Höök)

# Molecular Frontiers Symposium

DAY 1

Organized by The *Royal Swedish Academy of Sciences*  
and *Molecular Frontiers Foundation*

Date: Thursday May 7<sup>th</sup>, 2015  
Topic: **FRONTIERS IN MOLECULAR SCIENCES**  
Chairs: Prof Bengt Norden and Prof Richard Zare  
Venue: RunAn Conference Hall, Chalmers University of Technology,  
Chalmersplatsen 1, SE-412 58 Göteborg, Sweden

- 08:40-08:45 **Welcome note:** Prof Bengt Nordén, Chair of Molecular Frontiers Foundation
- 08:45-09:25 Nobel Laureate **AHMED ZEWAIL**, California Institute of Technology, United States  
*Seeing with Electrons in Four Dimensions*
- 09:25-10:05 Prof **GEORGE WHITESIDES**, Harvard University, United States  
*Water in Biomolecular Recognition*
- 10:05-10:35 **Coffee break**
- 10:35-11:15 Nobel Laureate **ARVID CARLSSON**, with Prof **ELIAS ERIKSSON**, University of Gothenburg, Sweden  
*Small molecules for signaling in the brain*
- 11:15-11:55 Prof **JACQUELINE BARTON**, California Institute of Technology, United States  
*DNA mediated signaling*
- 11:55-12:55 **Lunch break**
- 12:55-13:35 Prof **DAVID BUCKINGHAM**, University of Cambridge, United Kingdom  
*Chiral discrimination in NMR spectroscopy*
- 13:35-14:15 Prof **PETER DERVAN**, California Institute of Technology, United States  
*Transcription Factor Antagonists: From Discovery to Oncology*
- 14:15-14:55 Prof **SUSAN LINDQUIST**, Massachusetts Institute of Technology, United States  
*Lamarck was right: better living through chemistry.*
- 14:55-15:25 **Coffee break**
- 15:25-16:40 Youth Forum (Moderators Prof. Magdalena Eriksson and Dr Per Thoren)
- 16:40-17:00 *Let's all talk about science* (Dr Per Thoren and Dr Elizabeth Ball)

# Molecular Frontiers Symposium

DAY 2

Organized by *The Royal Swedish Academy of Sciences*  
and *Molecular Frontiers Foundation*

Date: Friday May 8<sup>th</sup>, 2015  
 Topic: **FRONTIERS IN MOLECULAR SCIENCES**  
 Chairs: Prof Bengt Norden and Prof Dina Petranovic  
 Venue: RunAn Conference Hall, Chalmers University of Technology,  
 Chalmersplatsen 1, SE-412 58 Göteborg, Sweden

- 08:30-09:10 Prof **FRANCES ARNOLD**, California Institute of Technology, United States  
*Evolution to expand the enzyme universe*
- 09:10-09:50 Prof **CHRIS DOBSON**, University of Cambridge, United Kingdom  
*Mechanisms and Consequences of Protein Misfolding*
- 09:50-10:20 **Coffee break**
- 10:20-11:00 Prof **RICHARD ZARE**, Stanford University, United States  
*Understanding chemical reactions at the molecular level*
- 11:00-11:40 Prof. **DINSHAW PATEL**, Memorial Sloan Kettering Cancer Center, United States  
*Cutting-edge RNA slicers*
- 11:40-12:40 **Lunch break**
- 12:40-13:20 Prof. **WAH CHIU**, Baylor College of Medicine, Houston, USA  
*Electron Cryo-Microscopy of Molecular Machines*
- 13:20-14:00 Nobel Laureate **SHUJI NAKAMURA**, University of California Santa Barbara, United States  
*Invention of Blue LED, Laser and Solid State Light*
- 14:00-14:20 **Coffee break**
- 14:20-15:30 **Panel discussion: Science and engineering in and outside of the classroom**  
 (Moderators: Bengt Norden and Dina Petranovic)
- 15:30-16:00 **Announcement of the winners of the 2015 Molecular Frontiers Inquiry Prize**  
 (Moderators Dr Per Thoren and Deborah Donnelly McLay)
- 16:00-16:15 Conclusion: Prof. **BARBARA CANNON**, President of the Royal Swedish Academy of Sciences
- 16:15-16:30 Closure: Prof. **BENGT NORDEN**, Founding Chairman of the Molecular Frontiers Foundation