

Program

**Nanotechnology in Medicine IV: Physical Triggers and
Advanced Materials for Translation**

**May 12-16, 2024
Tomar, Portugal**

Chairs

Shyni Varghese, Duke University, USA

Stefaan De Smedt, Ghent University, Belgium

Kaushal Rege, Arizona State University, USA

Co-Chairs

Milica Radisic
University of Toronto, Canada

Victor Shahin
University of Münster, Germany



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Previous conferences in this series:

Nanotechnology in Medicine: From Molecules to Humans

July 3-7, 2016

Hernstein, Austria

Conference Chairs:

Lola Eniola-Adefeso (Department of Chemical Engineering, University of Michigan, USA)

Paolo Decuzzi (Italian Institute of Technology, Italy)

Nanotechnology in Medicine II:

Bridging Translational in vitro and in vivo Interfaces

June 5-9, 2018

Grande Real Santa Eulalia Hotel, Albufeira, Portugal

Conference Chairs:

Millicent Sullivan

(Department of Chemical & Biomolecular Engineering, University of Delaware, USA)

Josué Sznitman

(Department of Biomedical Engineering, Technion-Israel Institute of Technology, Israel)

Nanotechnology in Medicine III: Enabling Next Generation Therapies

May 15-20, 2022

Grand Hotel San Michele, Cetraro (Calabria), Italy

Conference Chairs:

Milica Radisic (University of Toronto, Canada)

Victor Shahin (University of Münster, Germany)

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Sunday, May 12, 2024

16:00 – 17:45 Conference check-in

17:45 – 18:00 Conference Introduction
Chair: Prof. Kaushal Rege

TRANSLATIONAL NANOTECHNOLOGIES

18:00 – 18:30 **KEYNOTE**
Translating biomedical nanotechnologies across the NIH
David Rampulla, NIBIB, NIH, USA

18:30 – 19:00 **KEYNOTE**
Bench to Bedside in Nanoworld: A roadmap to breakthroughs that change patients' lives"
Ramin Darvari, Pfizer, Inc., USA

19:00 – 19:50 **OPENING PLENARY**
Optically-activated nano constructs provide microenvironment priming, imaging and therapy
Tayyaba Hasan, Harvard Medical School, USA

20:00 – 21:30 Dinner

21:30 Social period

NOTES

- *Audio, still photo and video recording by any device (e.g., cameras, cell phones, laptops, watches) is strictly prohibited during the technical sessions, unless the author and ECI have granted prior permission.*
- *Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).*
- *Speakers – Please leave at least 3 minutes for questions.*
- *Please do not smoke at any conference functions.*
- *Turn your cellular telephones to vibrate or off during technical sessions.*
- *After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.*

Monday, May 13, 2024

07:30 – 08:30 **Breakfast Buffet**

SESSION 1: ADVANCED DRUG DELIVERY

08:45 – 08:50 Introduction by **Session Chair: Prof. Rohan Fernandes**

08:50 – 09:20 **KEYNOTE**
Unlocking the potential: molecular fine-tuning of (live) biotherapeutics for enhanced oral and systemic drug delivery
Juliane Nguyen, University of North Carolina, USA

09:20 – 09:45 **Invited Talk**
Brain-targeted nanoparticles for treating Parkinsons Disease: From MABs to synthetic cells
Avi Schroeder, Technion, Haifa, Israel

09:45 – 10:15 **KEYNOTE**
Photoporation for drug delivery
Kevin Braeckmans, University of Ghent, Belgium

10:15 – 10:45 Coffee break

10:45 – 11:10 **KEYNOTE**
Near infrared light-activated formulation for the spatial controlled release of CRISPR-Cas9 ribonucleoprotein for brain gene editing
Lino Ferreira, University of Coimbra, Portugal

11:10 – 11:35 **Invited Talk**
Nanoinformatics: Using AI to optimize cancer nanomedicines
Yossi Shamay, Technion, Haifa, Israel

11:35 – 11:50 **Selected Talk**
Logic-gated uptake of protein nano-assemblies to triple negative breast cancer cells using colocalization-dependent latching orthogonal cage-key proteins (Co-LOCKR)
Antonio Goncalves, University of Delaware, USA

12:00 – 13:30 **Lunch**

SESSION 2: ADVANCED IMAGING AND IMAGE-GUIDED TECHNOLOGIES

13:30 – 13:40 Introduction by **Session Chair: Prof. Milica Radisic**

13:40 – 14:10 **KEYNOTE**
Micromechanical imaging of the tumor landscape
Seemantini Nadkarni, Harvard Medical School, USA

14:10 – 14:35 **Invited Talk**
Fluorinated nanoparticles as powerful bioimaging tools and delivery agents
Francesca Baldelli Bombelli, Politecnico di Milano, Italy

Monday, May 13, 2024 (continued)

- 14:35 – 15:00 **Selected Talk**
Switchable multimodal imaging and synergistic therapy with sequential PTT/PDT using J-aggregated porphyrin nanoparticles
Nahyun Kwon, University Health Network, Canada
- 15:00 – 15:30 Coffee break
- 15:30 – 15:55 **Invited Talk**
Implications of nuclear pore complexes for cancer
Victor Shahin, University of Münster, Germany
- 15:55 - 16:20 **Invited Talk**
Fluorescence-imaged guided drug delivery and photoimmunotherapy for Peritoneal metastasis in vivo
Huang-Chiao (Joe) Huang, University of Maryland, USA
- 16:20 - 16:35 **Selected Talk**
Aggregation induced emission based method to evaluate drug penetration and delivery in 3D tumor spheroids
Maytal Avrashami, Technion, Haifa, Israel
- 16:35 - 16:50 **Selected Talk**
Applications of ring perfluorocarbon nanoparticle contrast agents for Fluorine Magnetic Resonance Imaging
Yuri Chung, Georgetown University, USA
- 17:00 – 19:00 Poster Session / Social Hour
- 19:30 – 21:30 **Dinner**

Tuesday, May 14, 2024

07:30 – 08:45 **Breakfast Buffet**

SESSION 3: BIOFABRICATION AND TISSUE MODELS

08:45 – 08:50 **Introduction by Session Chair: Prof. Aereas Aung**

08:50 – 09:20 **KEYNOTE**
Geometric and cellular control of tissue vascularization
Milica Radisic, University of Toronto, Canada

09:20 – 09:50 **KEYNOTE**
Dynamic hydrogels through hierarchical assembly: bioinspiration and beyond
Kristopher Kilian, University of New South Wales, Sydney, Australia

09:50 – 10:15 **Selected talk**
A rapid device for iPSC-based autologous cell production
Yuguo Lei, Pennsylvania State University, USA

10:15 – 10:30 **Selected talk**
Modeling Neuroinflammation with Human Brain Organoids
Paris Brown, Duke University, USA

10:30 – 11:00 **Coffee Break**

11:00 – 11:30 **Special Talk**
Publishing in *Nature Materials*
Bruno Castro, Nature Materials

11:30 – 12:30 **SESSION 4: JUSTICE, EQUITY, DIVERSITY, AND INCLUSION**
Chair: Prof. Shyni Varghese

Opening Remarks: David Rampulla, NIBIB, USA (5min)
Opening Remarks: Avi Schroeder, Technion, Haifa, Israel (5 min)
Opening Remarks: Millicent Sullivan, University of Delaware, USA (5 min)
Opening Remarks: Treena Arenzei, Columbia University, USA (5 min)

Panelists for Discussion Session: (40 min)
Avi Schroeder, Technion, Haifa, Israel
David Rampulla, NIBIB, USA
Millicent Sullivan, University of Delaware, USA
Treena Arenzei, Columbia University, USA

12:30 – 13:45 **Lunch**

13:45 – 13:55 Meet in hotel lobby for excursion

14:00 – 18:00 **Walking excursion - Guided tour of the Convento de Cristo and Tomar**
Dinner “On your own” in Tomar

Wednesday, May 15, 2024

07:30 – 08:30 **Breakfast**

SESSION 5: TISSUE REPAIR & REGENERATION

08:30 – 08:35 Introduction by Session **Chair: Prof. Juliane Nguyen**

08:40 – 09:10 **KEYNOTE**
Stimuli-responsive nanofibers for tissue regeneration
Treena Arenzei, Columbia University, USA

09:10 – 09:35 **Invited Talk**
Laser-induced nanobubbles for advanced therapies in the eye
Felix Sauvage, University of Ghent, Belgium

09:35 – 09:50 **Antioxidant potential assessment of biosynthesized AgNPs and characterization of hepatoprotective phytoconstituents from vitis vinifera extract using LC-MS/MS**
Mazhar Abbas, University of Veterinary and Animal Sciences Lahore, Pakistan

09:55 – 10:30 **Coffee Break**

10:30 – 11:00 **KEYNOTE**
Collagen repair-driven gene therapy for treatment of chronic wounds
Millicent Sullivan, University of Delaware, USA

11:00 – 11:25 **Invited Talk**
Enzyme powered nanobots with photothermal and magnetic properties for biomedical applications
Juan Fraire, Institute for Bioengineering of Catalonia, Spain

11:25 – 11:50 **Invited talk**
Eco-friendly bioinks for 3D bioprinting of soft tissues
Vijayavenkataraman Sanjairaj, NYU Abu Dhabi, Saadiyat Campus, Abu Dhabi

12:00 – 13:30 **Lunch**

SESSION 6: IMMUNOENGINEERING

13:30 – 13:35 Introduction by **Session Chair: Victor Shahin**

13:35 – 14:05 **KEYNOTE**
Supramolecular peptide immunotherapies for inflammatory diseases
Joel Collier, Duke University, USA

14:05 – 14:30 **Invited Talk**
Photothermal nanoparticles immune engineer potent tumor-specific T cells for adoptive cell therapy
Rohan Fernandes, George Washington University, USA

14:30 – 14:55 **Invited Talk**
Targeted delivery of antigen for enhancing humoral immunity
Aereas Aung, University of Toronto, Canada

15:00 – 15:40 **Coffee Break**

Wednesday, May 15, 2024 (continued)

- 15:40 - 16:10 **KEYNOTE**
Tuning Intracellular Localization of Nano- and Micro- Particles in Phagocytic Immune Cells
Siddharth Jhunjhunwala, Indian Institute of Science, India
- 16:10 - 16:35 **Invited Talk**
Identifying targets for engineering self-tolerance after traumatic injury
Kaitlyn Sadtler, NIBIB/NIH, USA
- 17:00 – 18:45 Poster Session / Social Hour
- 19:00 – 19:50 **Closing Summary and Plenary**
Chair: Prof. Stefaan De Smedt
- CLOSING PLENARY**
Overcoming barriers in tumor targeted drug delivery
Fabian Kiessling, RWTH Aachen University, Germany
- 20:00 – 22:00 Conference Banquet and Presentation Awards

Thursday, May 16, 2024

- 07.30 Breakfast and Departures

Poster Presentations

- 1. Bone based Nanoparticles (BNPs) promotes osteogenic differentiation of Mesenchymal Stem Cells**
Shue Wang, University of New Haven, USA
- 2. A novel compound targeting nuclear pore complexes derived from Pitstop-2**
Silvio Terra Stefanello, University of Münster, Germany
- 3. Applications of ring perfluorocarbon nanoparticle contrast agents for Fluorine Magnetic Resonance Imaging**
Yuri Chung, Georgetown University, USA
- 4. Molecular engineering of multifunctional hyaluronic acid molecules to treat osteoarthritis**
Kiarra Richardson, Duke University, USA
- 5. High-precision 3D-printed microparticles with fractal patterns by Nanoscribe technology mimicking glomerulus structure**
Ying Wang, University of Toronto, Canada
- 6. Enhancing vascularization of engineered human cardiac tissues using endothelial extracellular vesicles**
Karl T. Wagner, University of Toronto, Canada
- 7. Nanomaterials for Gastrointestinal Surgeries**
Vanshika Singh, Arizona State University, USA
- 8. Delivery of Plasmid DNA with Differential Prokaryotic Methylation to Skin Facilitates Healthy and Diabetic Wound Healing, and Boosts Survival in Melanoma in Mice**
Trishita Chowdhury, Arizona State University, USA
- 9. Bioactive Silk Nanomaterials and Histamine Receptor Agonism Facilitate Effective Wound Healing, Tissue Repair, and Infection Control**
Shubham Pallod, Arizona State University, USA
- 10. Epicardial heart-on-a-chip constructs to model development and ischemia reperfusion injury**
Dawn Bannerman, University of Toronto, Canada