Mathematical Challenges in Ophthalmology

Thursday January 16, 2014

8:00–8:55 *Check-In/Light Breakfast (Hosted by IPAM)*

8:55–9:00 *Welcome and Opening Remarks*

9:00 *Robotic Session (Chairs: TC Tsao and JP Hubschman, UCLA)*

9:00–9:20 **Erik Dutson** (University of California, Los Angeles (UCLA))
Past, present and future of Robotic surgery

9:20–9:40 **Jean-Pierre Hubschman** (University of California, Los Angeles (UCLA))
Robotic Surgery in Ophthalmology

9:40–10:20 **Russell Taylor** (Johns Hopkins University)
A Microsurgery Assistant System for Retinal Surgery

10:40–11:10 *Break*

11:10–11:50 **Tsu-Chin "T.C." Tsao** (University of California, Los Angeles (UCLA))
The IRISS Platform

11:50–12:30 **Stefano Soatto** (University of California, Los Angeles (UCLA))
Overview of 3D Motion estimation and reconstruction from video streams (presented with Jonathan Balzer, UCLA)

12:30–12:40 *Discussion*

12:40–2:00 *Lunch (on your own)*

2:00 *Imaging Session 1 (Chairs: Emanuele Trucco and Irena Tsui, UCLA)*

2:00–2:20 **Irena Tsui** (University of California, Los Angeles (UCLA))
Ultra Wide Field Retinal Angiography

2:20–3:00 **Emanuele Trucco** (University of Dundee)
Automatic retinal image processing: the VAMPIRE project

3:00–3:30 **Zachary Taylor** (University of California, Los Angeles (UCLA))
The THz Laser

3:30–4:00 *Break*

4:00–4:20 **James Gibson** (University of California, Los Angeles (UCLA))
Adaptive Optics and Beam Steering for Disturbance Rejection and Target Tracking

4:20–4:50 **Bruno Uzzan** (Total Immersion)
Augmented reality: market and applications

4:50–5:10 *Discussion*

5:10–6:30 *Reception (Location: IPAM Lobby)*

Friday January 17, 2014

8:00–9:00	*Check-in/Breakfast (hosted by IPAM)*
9:00	*Imaging Session 2 (Chairs: Emanuele Trucco and Irena Tsui, UCLA)*
9:00–9:20	**Kouros Nouri-Mahdavi** (University of California, Los Angeles (UCLA)) *SD-OCT imaging in glaucoma: challenges and unmet needs*
9:20–9:40	**Warren Grundfest** (University of California, Los Angeles (UCLA)) *Spatiotemporal imaging spectroscopy: extraction of lifetime contrast information without the need for lifetime deconvolution*
9:40–10:00	**Steven Schwartz** (University of California, Los Angeles (UCLA)) *Adaptive Optics and Retinal Evaluation*
10:00–10:10	*Discussion*
10:01	*Simulation Session (Chair: Joseph Teran, UCLA)*
10:10–10:50	**Suvranu De** (Rensselaer Polytechnic Institute) *Virtual Surgery*
10:50–11:00	*Discussion*
11:00–11:20	*Break*
11:20–12:00	**Joseph Teran** (University of California, Los Angeles (UCLA)) *Simulation in real-time: virtual surgery*
12:00–12:40	**Jeff Eldredge** (University of California, Los Angeles (UCLA)) *Numerical simulations of the mechanics of vitrectomy*
12:40–12:50	*Discussion*
12:50–2:00	*Lunch (on your own)*
2:00–2:40	**Jernej Barbic** (University of Southern California (USC)) *Vega FEM library for nonlinear solid deformable object simulation*
2:40–3:00	**Pirouz Kavehpour** (University of California, Los Angeles (UCLA)) *Biomechanics of Vitreous Gel*
3:00–3:15	*Discussion*
3:15–3:45	*Discussion Break in Lobby and Conclusion of the Day*

Saturday January 18, 2014

8:00–9:00	*Check-in/Breakfast (hosted by IPAM)*
9:00	*Vision and Optics Session (Chairs: Michael Gorin and Jean-Pierre Hubschman, UCLA)*
9:00–9:40	**Pablo Artal** (University of Murcia) *The human eye as a robust optics system*
9:40–10:20	**Rich Braun** (University of Delaware) *Models for Tear Film Dynamics*
10:20–10:30	*Discussion*
10:30–10:50	*Break*
10:50–11:10	**Michael Gorin** (UCLA Medical School) *Mathematical modeling for hereditary eye disorders: Challenges and Opportunities*
11:10–11:50	**Eli Peli** (Harvard Medical School) *Challenges in Vision Rehabilitation: Computational Simulations of Impaired Vision*
11:50–12:10	*Discussion (turn page»>)*
12:10	*Saturday, January 18, 2014 (Continued)*
12:10–2:00	*Lunch (on your own)*
2:00–2:20	**Rex Hamilton** (University of California, Los Angeles (UCLA)) *Femtosecond Laser in Ophthalmology*
2:20–2:30	*Discussion*
2:30–2:50	**Vladimir Feingold** (Presbia, Inc.) *Implants for the treatment of Presbyopia*
2:50–3:30	**Sergio Barbero** (Consejo Superior de Investigaciones Científicas (CSIC)) *Power-adjustable optical systems for optometry applications (work with Jacob Rubenstein)*
3:30–3:45	*Discussion and Program Conclusion*