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11:10AM-12:00PM

Bourns Hall A265

Thermal and Biological Responses of Tissue to Cryogen Spray Cooling and Pulsed Laser Irradiation

Abstract: In laser dermatologic surgery, pulsed laser irradiation in conjunction with cryogen spray cooling allows controlled heating of a specific target underneath human skin such as malformed blood vessels, hair follicles etc. In this talk, I will first briefly introduce the fundamentals, namely selective photothermolysis and dynamic skin cooling. I will then present my research on the following topics: 1) Environmentally- and patient-friendly cryogen spray cooling technique which reduces contribution to global warming and alleviates patient discomfort; 2) Study of laser therapy to treat disfiguring port wine stain birthmarks using numerical and animal models. It was found that severely damaged blood vessels can be regenerated within two weeks, which may explain why birthmark blanching cannot be achieved even significant vessel injury is induced; and 3) Combined laser and antiangiogenic therapy to improve the therapeutic outcome of port wine stain birthmarks. The rationale of the combined therapy is that laser is used to induce injury of the malformed blood vessels, and then an antiangiogenic drug is subsequently administered to prevent blood vessel reformation and reperfusion. Encouraging clinical result has been recently achieved.

Bio: Dr. Jia received his Ph.D. degree in Mechanical Engineering from the Hong Kong University of Science and Technology in 2001 with an emphasis in heat transfer and laser diagnostics. After completing his postdoctoral fellowship in the Boiling Heat Transfer Lab at UCLA, Dr. Jia joined the Beckman Laser Institute in 2004 where he is currently an Assistant Researcher. Dr. Jia's research interests includes spray cooling, light tissue interaction, antiangiogenic therapy, laser dosimetry, infrared thermography and laser phase Doppler anemometry. Dr. Jia's most recent recognitions include Dr. Horace Furumoto Innovations Professional Development Award from the American Society for Laser Medicine and Surgery.