Health Physics Society
Northern California Chapter, Inc.

Joint Meeting of
The Health Physics Society - Northern California Chapter
and
The American Association of Physicists in Medicine – Bay Area Section

Speaker: **Dr. Joerg Lehman, DABR**
Assistant Adjunct Professor
University of California, Davis
Department of Radiation Oncology

Title: **"Dosimetry for in vivo studies on the effect of low doses of ionizing radiation on humans"**

Date: **January 18, 2007**

Time:
6:00 – 7:00 PM social hour, no host bar
7:00 – 8:00 PM dinner
8:00 – 9:00 PM speaker's presentation

Location: **19 Market** - *Modern Vietnamese Bistro & Bar*
19 North Market St.
San Jose, CA 95113
(408) 280-6111
http://www.19market.com

Parking: Free parking in the 6-level garage next to the restaurant after 6:00PM (2 hour validation) + street parking.

Cost: **NCCHPS members-** $25 (at the door $30)
NCCHPS member's
Spouses - $30
Students - $10
Non members - $38

Deadline: Please register **by January 12, 2007 !**

To register: Register online at: http://hpschapters.org/ncchps/meetings.php3
Only online registrations will be accepted. Please contact Quang Le (quangles@sbcglobal.net) ONLY if there are difficulties encountered with online registrations

Dinner Menu: This restaurant serves family-style dinners so everyone at the table can taste a wide variety of dishes. The menu will include:

- Green papaya & mango salad
- Crisp rolls with crab meat, shrimp, pork, taro root, carrots and spicy dip sauce
- Minced shrimp, Cheddar & Monterey Jack cheese and fresh herbs on crisp baguette.
- Grilled salmon with spicy green beans
- Cubed filet mignon wok tossed with onion, garlic& black pepper served with water cress & cherry tomatoes
- Scallops in black bean sauce
- Peasprout with mushroom in garlic black bean sauce
- Deep fried banana and jackfruit wrapped in light & crispy wonton shell. Served with coconut pineapple ice cream & chocolate syrup.

Speaker: **Dr. Joerg Lehman**
Assistant Adjunct professor, UC Davis,
Department of Radiation Oncology

Title: "**Dosimetry for in vivo studies on the effect of low doses of ionizing radiation on humans**"

Abstract:

The significance of the biological activity of low-dose ionizing radiation in the range of 1–10 cGy is a subject of contention. While there is ample evidence from in vitro cell culture models that doses as low as 1 cGy result in changes in the transcriptome the cells used in such studies lack the complexity of three-dimensional tissue. In addition, cell lines are immortalized or transformed and live on artificial substrates. Thus, to develop rational, scientifically sound public policy on safe low-dose exposures, it is necessary to obtain data directly in humans. While it is not possible to irradiate volunteers prospectively for the purpose of such studies, humans are irradiated daily for the treatment of cancer. These patients can be a study population if the physics and dosimetry of their treatment plans can be made sufficiently robust to prospectively identify sites of low- dose exposure from which tissue samples can be obtained.

Since the doses of interest in support of public policy are well below those used in therapy (1–10 cGy and 2 Gy, respectively) and the treatment plans are essentially fixed by therapeutic strategy (multiple-beam, conformal treatment portals), the dosimetry is complex. Low-exposure points are outside of the treatment portal, an area that is insufficiently modeled in standard treatment planning systems. We therefore used a Monte Carlo treatment planning system for this study. We have designed, validated and implemented a research protocol to identify the location of biopsy points on the volunteer patient's skin surface with a dosimetric uncertainty of 15% or better, which is well within the acceptable uncertainty for support of clinical/biological studies. The PEREGRINE Monte Carlo simulation system was used to model radiation dose delivery, and TLDs were used for validation on phantoms and for confirmation during patient treatment. Using a single, thickness-independent correction factor for the clinical calculations, the average of 36 measurements for the predicted 1-cGy point was 0.985 cGy (standard deviation: 0.110 cGy) despite patient breathing motion and other real-world challenges.* Since the 10-cGy point is situated in the region of high dose gradient at the edge of the field, patient motion had a greater effect. An in-vivo measurement technique using linear arrays of MOSFET detectors has been developed and successfully employed for these data points.

About the Speaker:

Dr. Joerg Lehmann obtained his formal education in Germany. His thesis work was on the design of ionization chambers for clinical electron dosimetry. Beginning 1999 he worked as a visiting researcher, postdoctoral fellow and staff physicist at the Stanford University Department of Radiation Oncology, where he engaged in various research and clinical projects, including Intravascular Brachytherapy (IVBT) and Intensity Modulated Radiation Therapy (IMRT). In 2002 Dr. Lehmann joined LLNL as a physicist and worked on projects using dosimetric measurement methods and Monte Carlo simulations. As part of the LLNL UC Davis Cancer Caner he became adjunct faculty at UC Davis in 2003. He left LLNL in 2005 and works now as research physicist in the UC Davis Department of Radiation Oncology. His research is focused on Image Guided Radiotherapy (IGRT), Monte Carlo based design of beam models for radiation treatment planning systems and studies in combined nanoparticle thermotherapy and radiation therapy.
Dr. Lehmann is author or co-author of 20 peer reviewed publications, one book chapter and over 70 presentations at scientific meetings.