



The Institute of Electrical and Electronics Engineers
(IEEE)



Galveston Bay Section Meeting

Organized by Computer Society Chapter

May 17th, 2018 (Thursday) Luncheon Meeting

TOPIC: “GPU Programming for Biologically Optimized Intensity Modulated Ion Therapy Experiments”

SPEAKER: Drake Gates, NASA Johnson Space Center

PRESENTATION:

In charged particle therapy, we aim to utilize both the physical and radiobiological advantages of charged particles to improve the therapeutic index of treatment plans. Utilizing a beam scanning technique provides the flexibility to implement biological dose optimized intensity-modulated ion therapy (IMIT). The plan optimizer can selectively place the most biologically effective part of the beamlets, usually those low-energy (high linear energy transfer) particles around the Bragg peak, into the tumor volumes, sparing normal tissues and critical organs. The purpose of this study is to develop easy-to-implement algorithms to rapidly generate the desired shape, usually a flat spread-out Bragg peak (SOBP), of physical or biological dose distributions within the target volume using scanned ion beams. Protons, helium and carbon ions are selected to demonstrate the feasibility and flexibility of our method. Individual energy beamlets are rapidly summed in parallel using CUDA to generate a field of individual beam spots for that model each energy layer that can be produced in the proton therapy center at MD Anderson Cancer Center. These fields are optimized to give more weight to low linear energy transfer (LET) beams as well as to reduce the fragmentation tail in order to improve the therapeutic index.

GUEST SPEAKER:

Drake Gates is an Orbital Debris Scientist at Johnson Space Center under the JETS contract with Jacobs. He holds a B.S. degree in physics from Baylor University and a M.S. degree from Syracuse University. His past research experience is computer modeling based and includes: string theory phenomenology, molecular dynamics, and heavy ion therapy.

Gilruth Recreation Center NASA-JSC, Discovery Room (downstairs)

Free parking. No security processing required. Easy drive in off Space Center Blvd. See website below for map.

Interested non-IEEE engineers, technicians, scientists, IEEE Members and guests alike are welcome!

12:00 PM – 1:00 PM - Program and Q&A

11:30 AM - Light Lunch with reservation (\$10.00 donation). Complimentary for IEEE student members with reservation. Please RSVP Before Noon Tuesday May 15th, 2018

Reservations for lunch or to attend this meeting should be made by email to:

d.k.rutishauser@ieee.org

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