Stanford

Vivek Maradia

Postdoctoral Scholar, Radiation Therapy

Bio

HONORS AND AWARDS

- 25th Christoph-Schmelzer-Award for outstanding PhD theses related to tumor therapy with ion beams, GSI Helmholtz Centre for Heavy Ion Research (Nov 2023)
- Best PhD award in Medical Physics 2023, German Society of Medical Physics (DGMP) (Sep 2023)
- Best PhD award in Applied Physics 2023, Swiss Physical Society (Sep 2023)
- Varian Recognition Award 2022 for best research paper in medical physics, Swiss Society of Radiation Biology and Medical Physics (SSRMP) (Oct 2022)
- PTCOG 2022 Travel Fellowship, PTCOG (June 2022)
- European Student Grant for IPAC 2022, European Physical Society (June 2022)
- Best Poster Award, 4D treatment workshop on particle therapy, Delft, The Netherlands (Nov 2021)
- European Student Grant for IPAC 2021, European Physical Society (June 2021)
- Nuclear Innovation Scholarship, IMT foundation (July 2017)
- IMT Challenge 2017 Airbus Award (for Best Start-up Idea), École Nationale Supérieure des Mines, France (June 2017)
- Travel Grant to participate in ICTP/IAEA Nuclear Energy Management School, International Atomic Energy Agency (IAEA) (Oct 2016)
- J. N. Tata Scholar (Scholarship for master studies), J. N. Tata Foundation (Sep 2016)
- Excellence Scholarship, IMT Atlantique, Nantes, France (Sep 2016)
- Nuclear Olympiad 2015, Third Rank, IAEA, Vienna, Austria, World Nuclear Association (Sep 2015)
- Robert J. Sorenson Scholarship 2014 (Best Student Member of the Year 2014), Institute of Nuclear Materials Management, Atlanta, USA (July 2014)
- Partnership for Nuclear Security Scholarship for an exchange program with Texas A&M University, USA, US Department of State (May 2014)
- Travel Grant to participate in IAEA-ICTP School on Nuclear Security, International Atomic Energy Agency (IAEA) funding (April 2024)
- Partnership for Nuclear Security Scholarship to participate in School on Radiation Technology, US Department of State (March 2014)
- Travel Scholarship to participate in American Nuclear Society Winter Meeting, US Department of State (Nov 2013)
- Travel Scholarship for PATRAM 2013 annual meeting, US Department of State (Sep 2013)
- Young Scientist Scholarship, Science and Engineering Research Board (SERB), Government of India. (April 2013)
- Graduate Aptitude Test in Engineering Scholarship, Government of India (July 2012)

PROFESSIONAL EDUCATION

- Doctor of Science, ETH Zurich , Physics (2023)

PATENTS

- Vivek Maradia. " Patent EP21173019 Compact beam transport system for multi-room particle therapy facility", May 12, 2022

- Vivek Maradia. " Patent EP21163081 A particle beam transport system for the delivery of particle beam therapy", Mar 18, 2022
- Vivek Maradia. " Patent EP21185726 Optimized matching of beam emittance and collimation system to maximize transmission through beamline", Jul 15, 2021

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My current focus lies in the simulation and experimental implementation of ultra-high dose rate delivery utilizing proton, x-ray, and electron beams for FLASH preclinical studies, with potential applications in clinical research.

Within this domain, I am deeply engaged in exploring the dynamic interplay between various parameters such as beam energy, dose rate, and biological response. Through a combination of computational modeling and hands-on experimentation, I endeavor to unravel the underlying mechanisms governing the efficacy and safety of ultra-high dose rate delivery systems.

By delving into the intricacies of FLASH preclinical studies, my efforts are directed towards unlocking transformative insights that could revolutionize the landscape of cancer therapy. These endeavors pave the way for the development of innovative treatment modalities with the potential to redefine standards of care and enhance patient outcomes in the realm of oncology.

Additionally, drawing upon the valuable insights garnered from the beamline upgrade at PSI's PROScan facility, I am spearheading the design of a compact cyclotron-based proton therapy infrastructure. This innovative design is envisioned to be versatile enough to accommodate conventional radiation therapy bunkers or multi-room facilities akin to tennis courts.

Publications

PUBLICATIONS

- **Demonstration of momentum cooling to enhance the potential of cancer treatment with proton therapy** *NATURE PHYSICS*
  Maradia, V., Meer, D., Doelling, R., Weber, D. C., Lomax, A. J., Psoroulas, S.
  2023
- **Momentum cooling can improve transmission rates for proton therapy** *NATURE PHYSICS*
  Maradia, V., Psoroulas, S.
  2023
- **A novel method of emittance matching to increase beam transmission for cyclotron-based proton therapy facilities: simulation study** *Journal of Physics: Conference Series*
  Maradia, V., Meer, D., Lomax, A. J., Schippers, J. M., Psoroulas, S.
  2023
- **A novel intensity compensation method to achieve energy independent beam intensity at the patient location for cyclotron based proton therapy facilities** *Journal of Physics: Conference Series*
  Maradia, V., Meer, D., Lomax, A. J., Psoroulas, S.
  2023; 2420 (1)
- **Universal and dynamic ridge filter for pencil beam scanning particle therapy: a novel concept for ultra-fast treatment delivery.** *Physics in medicine and biology*
  Maradia, V., Colizzi, I., Meer, D., Weber, D. C., Lomax, A. J., Actis, O., Psoroulas, S.
  2022; 67 (22)
- **Ultra-fast pencil beam scanning proton therapy for locally advanced non-small-cell lung cancers: Field delivery within a single breath-hold.** *Radiotherapy and oncology : journal of the European Society for Therapeutic Radiology and Oncology*
  Maradia, V., van de Water, S., Meer, D., Weber, D. C., Lomax, A. J., Psoroulas, S.
  2022; 174: 23-29

- **Application of a scattering foil to increase beam transmission for cyclotron based proton therapy facilities** *FRONTIERS IN PHYSICS*
  Maradia, V., Meer, D., Weber, D., Lomax, A., Schippers, J., Psoroulas, S.
  2022; 10
- **Increase of the transmission and emittance acceptance through a cyclotron-based proton therapy gantry.** *Medical physics*
  Maradia, V., Giovannelli, A. C., Meer, D., Weber, D. C., Lomax, A. J., Schippers, J. M., Psoroulas, S.
  2022; 49 (4): 2183-2192
- **Beam properties within the momentum acceptance of a clinical gantry beamline for proton therapy.** *Medical physics*
  Giovannelli, A. C., Maradia, V., Meer, D., Safai, S., Psoroulas, S., Togno, M., Bula, C., Weber, D. C., Lomax, A. J., Fattori, G.
  2022; 49 (3): 1417-1431
- **Different Methods to Increase the Transmission in Cyclotron-Based Proton Therapy Facilities** *CYCLOTRONS 2022*
  Maradia, V., Meer, D., Lomax, A. J., Schippers, M., Psoroulas, S.
  2022
- **Upgrade of a Clinical Facility to Achieve a High Transmission and Gantry Angle-Independent Flash Tune** *Proc. 23rd Int. Conf. Cyclotrons Appl. (CYCLOTRONS'22)*
  Colizzi, I., Maradia, V., Kuenzi, R., Gabard, A., Baumgarten, C., Lomax, A. J., Meer, D., Psoroulas, S.
  2022
- **A new emittance selection system to maximize beam transmission for low-energy beams in cyclotron-based proton therapy facilities with gantry.** *Medical physics*
  Maradia, V., Meer, D., Weber, D. C., Lomax, A. J., Schippers, J. M., Psoroulas, S.
  2021; 48 (12): 7613-7622
- **A Novel Beam Optics Concept to Maximize the Transmission Through Cyclotron-based Proton Therapy Gantries** *IPAC 2021*
  Maradia, V., Meer, D., Lomax, A., Schippers, M., Psoroulas, S.
  2021