

# Syamantak Khan, PhD

Postdoctoral fellow, Department of Radiation Oncology, Stanford University

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## Education

Ph.D., Chemistry	Indian Institute of Technology, Mandi, India	2018
M.Tech., Biotechnology (dual degree)	Indian Institute of Technology, Kharagpur, India	2012
B.Tech., Biotechnology (dual degree)	Indian Institute of Technology, Kharagpur, India	2012

## Positions & Academic Appointments

Postdoctoral Researcher at Radiation Oncology, Stanford University	2018-Present
Postdoctoral Fellow at Third Institute of Physics, Georg-August-University, Germany	2018
Guest Scientist at Third Institute of Physics, Georg-August-University, Germany	2016
Research Fellow (Ph.D. Candidate), Indian Institute of Technology, Mandi. India	2014-2018
Research Associate, Indian Institute of Technology, Mandi. India	2012-2014

## Honors & Awards

NIH Pathway to Independence	2023
AAPM Research Seed Funding Award	2023
AAPM Expanding Horizon Travel Award	2022
Scholar in Training Travel Award, Radiation Research Society	2022
Poster Award (First Place), Medical Physics Research Symposium, Stanford University	2022
Mitikani Research Funding Award, Stanford Cancer Institute	2021
Radiation Oncology Trainee Seed Grant Award, Stanford University School of Medicine	2021
Young Investigator Award (First Place), AAPM, Northern California Chapter	2020

## Research Grants

1. NIH K99/R00 NIH (NIDCR)  
Role: PI (Mentored by G. Prax & J.B. Sunwoo) *Awarded, 07/03/2023 - 06/30/2028*  
Title: Novel OrganoPET Assay for Precision Therapy of Head and Neck Cancer (Impact score: 21)
2. AAPM Seed Grant AAPM  
Role: PI (Mentored by G. Prax) *Awarded, 08/01/2023 - 07/31/2024*  
Title: Investigating the risk of tumor sparing with ultra-high dose FLASH radiotherapy
3. Mikitani Radiobiology Research Grant Stanford Cancer Institute  
Role: PI (Mentored by G. Prax) *Completed, 09/01/2021-12/31/2022*  
Title: The role of lipid peroxidation and ferroptosis in ultra-high dose FLASH radiotherapy
4. Radiation Oncology Seed Grant Stanford University School of Medicine  
Role: PI (Mentored by G. Prax) *Completed, 07/01/2021 - 06/31/2022*  
Title: High throughput screening of patient-derived tumor organoids using PET radiotracers

## Peer-Reviewed Research Publication

2021-Present (7 Publications)

1. **S. Khan** & G Pratz Next-generation techniques to study radiopharmaceuticals using in vitro cancer models. Springer (Accepted, *Book Chapter*).
2. A Natarajan<sup>‡</sup> **S Khan**<sup>‡</sup>, X Liang, H Nguyen, N Das, D Anders, N Malik, O M. Oderinde, F Chin, E Rosenthal, G Pratz. Preclinical evaluation of <sup>89</sup>Zr-Panitumumab for biology-guided radiotherapy. *IJROBP*, 2023, 116, 927-934. PMID: 36669541 (‡ equal contribution).
3. **S. Khan**, J H Shin, N Cheng, C Kuo, J Sunwoo, G Pratz. High-resolution positron emission microscopy of patient-derived tumor organoids. *Nat. Commun.* 2021, 12, 58883. PMID: 34620852.
4. **S. Khan**, M Bassenne, J Wang, R Manjappa, D Y. Breitzkreutz, P G. Maxim, L Xing, B W. Loo Jr, G Pratz\* Multicellular Spheroids as In Vitro Models of Oxygen Depletion During FLASH Irradiation. *IJROBP*, 2021, 110, 833-844. PMID: 33545301.
5. **S. Khan**, S Kim, YP Yang & G Pratz, "High-resolution radioluminescence microscopy of FDG uptake in an engineered 3D tumor-stoma model," *Eur J Nucl Med Mol Imaging* 2021, 48, 3400-3407. PMID: 33880604.
6. M J Neufeld, H Winter, M R. Landry, A M Goforth, **S. Khan**, G Pratz, and C Sun Lanthanide Metal-Organic Frameworks for Multispectral Radioluminescent Imaging. *ACS Applied Materials & Interfaces*, 2020
7. Y Ren, J G. Rosch, M R. Landry, H Winter, **S. Khan**, G Pratz and C Sun Design and synthesis of Tb doped Core-shell-shell nanophosphor for improved X-ray luminescence efficiency and X-ray induced photodynamic therapy

2016-2020 (10 Publications)

8. **S. Khan**, A. Sharma, S. Ghoshal, S. Jain, M. Hazra, C. K. Nandi, Small Molecular Organic Nanocrystals Resemble the Properties of Carbon Nanodots, *Chem. Sci.*, 2018,9, 175-180.
9. **S Khan**,\* N C Verma, C Rao, C K Nandi, Carbon Dots for Single-Molecule Imaging of the Nucleolus *ACS Appl. Nano Mater.*, 2018, 1, 483-487(\* co-corresponding author)
10. **S. Khan**, S Jain, CK Nandi. Towards Understanding Citric Acid Derived High Quantum Yield Molecular Fluorophores: From Carbon Dots to Spherical Organic Nanocrystals. *J Material Sci Eng.* 2018, 7, 2169-0022.
11. **S Khan**, N C Verma, P Gupta, S Jain, S Ghosh, CK Nandi. Mechanistic Insight into the Carbon Dots: Protonation-induced Photoluminescence. *J Material Sci Eng.* 2018. 7, 2169-0022.
12. **S. Khan**, W. Li, N. Karedla, J. Thiart, I. Gregor, A. M. Chizhik, J. Enderlein, C. K. Nandi, A. I. Chizhik, Charge-Driven Fluorescence Blinking in Carbon Nanodots. *J. Phys. Chem. Lett.*, 2017, 8, 5791-5757.

13. C Rao, **S Khan**,\* N C Verma, C K Nandi, Labelling of Proteins with Carbon Nanodots. Chem. Bio. Chem. 2017, 18, 2385-89. (\*co-corresponding author)
14. A Gupta, N C Verma, **S. Khan**, S Tiwari, A Chaudhary, C K Nandi, Paper strip based and live cell ultrasensitive lead sensor using carbon nanodots synthesized from biological media, Sensors and Actuators- B, 2016, 232, 107-114.
15. A Gupta, N C Verma, **S. Khan**, C K Nandi, Carbon nanodots for Naked Eye Colorimetric Ultrasensitive Arsenic and Glutathione Detection, Biosensors and Bioelectronics, 2016, 81, 465-472.
16. A Chaudhary, **S. Khan**, A Gupta, C K Nandi, Effect of surface chemistry and morphology of gold nanoparticle on the structure and activity of common blood proteins. New J. Chem, 2016, 40, 4879-4883.
17. NC Verma, **S. Khan**, CK Nandi, Single-molecule analysis of fluorescent carbon dots towards localization-based super-resolution microscopy, Methods and Applications in Fluorescence, 2016, 4, 044006.

*2011-2015 (8 Publications)*

18. **S. Khan**, A Gupta, N C Verma, C K Nandi, Time-Resolved Emission Reveals Ensemble of Emissive States as the Origin of Multicolor Fluorescence in Carbon nanodots. Nano Lett., 2015, 15, 8300-8305.
19. **S. Khan**, N C Verma, C K Nandi, Reversible Photoswitching of Carbon nanodots Sci Rep, 2015, 5, 11423.
20. **S Khan**, A Gupta, N C Verma, C K Nandi, Kinetics of Protein Adsorption on Gold Nanoparticle with Variable Protein Structure and Nanoparticle Size, J. Chem. Phys. 2015, 143, 164709.
21. A Gupta, A Chaudhary, P Mehta, C Dwivedi, **S. Khan**, N C Verma, C K Nandi, Nitrogen-Doped Thiol Functionalized Carbon nanodots for Ultrasensitive Hg (II) Detection, Chem. Commun., 2015, 51, 10750-10753.
22. **S. Khan**, A Gupta, A Chaudhary, C K Nandi, Orientational switching of protein conformation as a function of nanoparticle curvature and their geometrical fitting, J. Chem. Phys., 2014, 141, 084707.
23. **S. Khan**, C. K. Nandi, Optimizing the underlying parameters for protein-nanoparticle interaction: advancement in theoretical simulation, Nanotechnol. Reviews, 2014, 3, 347-359
24. A Chaudhary, A Gupta, **S. Khan**, C K Nandi, Morphological effect of gold nanoparticles on the adsorption of bovine serum albumin, Phys. Chem. Chem. Phys., 2014, 16, 20471-20482
25. **S. Khan**, A Gupta, C K Nandi, Controlling the fate of protein corona by tuning surface properties of nanoparticles, J. Phys. Chem. Lett., 2013, 4, 3747-3752.

*Under Review/Preparation*

26. **S. Khan et al**, Radiolabeling with mesoporous silica nanoparticles for in vivo single-cell tracking
27. **S. Khan et al**, Sparing of A549 spheroid is ferroptosis-independent in FLASH radiotherapy

## Key Conference Presentations

(8 First-authored Abstract)

**S. Khan**, N. Das, V. Viswanathan, S. Melemenidis, B. Loo, G. Pratz. The role of ferroptosis in ultra-high dose rate FLASH radiation therapy. Accepted, RRS Annual meeting 2022, Hawai. **(Oral Presentation)**.

**S. Khan**, G Pratz. Efficient Nanoparticle-Mediated Radiolabeling of Cells for in Vivo PET Tracking. AAPM Annual Meeting 2022, Washington DC **(Oral Presentation)**.

**S. Khan**, A. D. Bick, B. Nabet, M. Diehn, S. K.Y. Tang, and G. Pratz. 18F-Fluorodeoxyglucose Imaging Of Tumor-On-A-Chip. MicroTas 2021, Palm Spring, CA. **(Spotlight Poster)**

**S. Khan**, M. Bassenne, J. Wang, R. Manjappa, B.W. Loo Jr., G. Pratz FLASH Irradiation of Avascular Tumor Spheroids. ASTRO Annual Meeting 2020 **(Poster)**. *Publication: International Journal of Radiation Oncology Biology Physics, 108, E558, (DOI: 10.1016/j.ijrobp.2020.07.1728).*

**S. Khan**, J H Shin, N Cheng, C Kuo, J Sunwoo, G Pratz. High-Resolution Positron Emission Microscopy of Patient-Derived Tumor Organoids. WMIC Virtual, Bridging Biology and Medicine with Molecular Imaging 2020. **(Oral Presentation)**

**S. Khan**, J H Shin, N Cheng, C Kuo, J Sunwoo, G Pratz. High-resolution positron emission microscopy of patient-derived tumor organoids. AACR Emerging Landscape of Cancer Modelling 2020, San Diego, CA **(Poster)**. *Publication: Cancer Res 2020, 80, B08. (DOI: 10.1158/1538-7445.CAMODELS2020-B08)*

**S. Khan**, N. C. Verma, C. K. Nandi. Structure and properties of fluorescent carbon nanodots. Advanced Functional Material Conference, University of California, Los Angeles, 2017. **(Oral Presentation)**

**S. Khan**, A. Gupta, N. C. Verma, C. K. Nandi. Origin of Excitation Dependent Fluorescence in Carbon Dots. Recent Advances in Molecular Spectroscopy: Fundamentals and Applications in Materials and Biology. Hyderabad, India 2016. **(Poster)**

## Professional Memberships

Biomedical Engineering Society	Member	2023 – Present
American Association of Physicists in Medicine	Junior Member	2022 – Present
Radiation Research Society	Senior SIT Member	2022 – Present
American Association for Cancer Research	Associate Member	2019 – Present

## Teaching Experience

Radiobiology and Radionuclide therapy (BIOE 221 / RAD 221), Guest Lecture	Stanford	2020
Physical Chemistry Lab, Teaching Assistant to Dr. C Nandi	IIT Mandi	2016
Computation for Engineers, TA to Prof. T. Gonsalvez	IIT Mandi	2015
Physical Chemistry Lab, Teaching Assistant to Dr. A Halder	IIT Mandi	2014