SCMPCR
South Asia Centre for Medical Physics and Cancer Research
SCMPCR Newsletter
A sister organization of Alo-BT
February 2026 / Volume 8 / Issue 1
QUALITY EDUCATION AND HEALTH SCIENCE FOR PATIENT BENEFIT

General Article

Becoming a GREMP Mentee: Reflections on Learning, Mentorship and Building Research Skills in AI-Driven Medical Physics

Mohammad Ullah Shemanto
Evercare Hospital Chattogram, Bangladesh

Medical physics in low- and middle-income countries (LMICs) is dominated by heavy clinical workloads, leaving limited opportunity for research, despite rapidly expanding radiotherapy services. In Bangladesh, medical physicists are responsible for treatment planning, machine commissioning, quality assurance, imaging QA, and radiation safety, often with little protected time or mentorship for research. As a result, local contributions to advanced medical physics research, especially in artificial intelligence (AI), remain limited.

My selection as a mentee in the Global Research and Mentorship Program (GREMP) marked a major shift in my professional journey from a clinically focused physicist to an emerging researcher in AI-driven cancer outcome modeling. This article summarizes my GREMP experience, from proposal development to mentorship, interdisciplinary collaboration, and skill building.

GREMP: A Global Research Capacity-Building Model

GREMP was established to strengthen medical physics and cancer research capacity in LMICs by pairing early-career professionals with experienced international mentors. Unlike short-term fellowships, GREMP is a longitudinal, mentorship-driven program focused on developing sustainable research skills such as problem formulation, study design, data analysis, and scientific writing.

Selection into GREMP is competitive and based on motivation, scientific potential, and commitment rather than prior research output. I was selected as a GREMP mentee and, to my knowledge, the only medical physicist from Bangladesh in this program. This carried both professional significance and responsibility to represent my country and build local research capacity.

A key figure in this process was Dr. Manju Sharma, PhD (UCSF), Chair of the GREMP subcommittee. She provided strategic guidance during proposal development, ensured appropriate mentor matching, and supported access to validation datasets, helping ensure scientific rigor and sustainability of the project.

Mentorship Structure and Proposal Development

GREMP follows a three-member mentorship model: one global mentor, one local mentor, and one mentee. My mentors were:

Global Mentor: Dr. Sharon Qi, PhD, DABR (Associate Professor, UCLA)
Local Mentor: Prof. Dr. Hasin Anupama Azhari (United International University; Director, South Asia Centre for Medical Physics and Cancer Research)

My initial proposal broadly focused on head-and-neck cancer. Under Prof. Azhari's guidance, this was transformed into a scientifically structured research plan with defined hypotheses, endpoints, and methodology. I then presented the proposal before a GREMP evaluation panel and was selected based on scientific merit, motivation, and readiness to learn.

From Clinical Thinking to Site-Specific AI Modeling

Once paired with Dr. Sharon Qi, my research perspective changed fundamentally. Drawing on her expertise in outcome modeling and imaging-guided radiotherapy, she emphasized that biological and site specificity are critical for AI. Head-and-neck cancer is highly heterogeneous, which can degrade model learning. Under her guidance, the project was refined to focus on oropharyngeal squamous cell carcinoma (OPSCC), improving biological consistency, feature learning, and model interpretability.

Figure 1. GREMP mentorship and collaborative research team

Learning to Work with Public Datasets

Our hospital's limited OPSCC data could have been a barrier, but Dr. Qi reframed this as a learning opportunity. I was introduced to The Cancer Imaging Archive (TCIA) and trained in dataset selection, annotation standards, and ethical research use. I learned that high-quality AI research depends more on study design, curation, and validation than on local data volume alone.

Radiomics and Deep Learning

The project began with handcrafted radiomics, using tools such as 3D Slicer, where I learned how segmentation quality, voxel normalization, and preprocessing affect feature stability. This built my understanding of shape, first-order, and texture features. The study then progressed to deep learning–based feature extraction using convolutional neural networks on CT images. Comparing handcrafted and deep features highlighted key trade-offs between interpretability, generalizability, and predictive power in clinical AI models.

Interdisciplinary Collaboration and Skill Building

A major early challenge was my limited programming background. Prof. Azhari facilitated collaboration with a Computer Science and Engineering student, creating a bidirectional learning model. I provided clinical and imaging insight, while the student supported Python programming and machine-learning workflows. Over time, I learned to critically understand and evaluate the entire AI pipeline, demonstrating the power of interdisciplinary teamwork in modern medical physics research.

Integrating Imaging and Clinical Data

The final workflow integrated CT-based deep radiomics with clinical biomarkers such as HPV/p16 status, smoking history, TNM stage, and tumor volume. Survival modeling was performed using Cox-based neural networks to predict overall and disease-free survival. Regular mentor meetings ensured both methodological rigor and clinical relevance.

Impact of GREMP

GREMP reshaped my professional identity. I learned to critically assess AI literature, understand uncertainty and bias in predictive models, and collaborate across disciplines. Most importantly, I realized that one does not need to begin as an AI expert to contribute meaningfully to AI-driven medical physics.

By providing research mentorship to LMIC physicists, GREMP provides an equitable and scalable model for global research capacity building. With structured mentorship and collaborative learning, advanced data-driven research is achievable even in resource-limited settings.