Issam El Naqa, Ph.D., DABR, FAAPM, FIEEE, FAIMBE
Chair, Senior Member, Distinguished Moffitt Scholar
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Education and Training

Education

09/1987-05/1992	BS, Electrical Engineering (top 1%), Graduation Project: "Application of Computer Aided Design in Control", University of Jordan, Amman, Jordan
09/1992-01/1995	MS, Electrical Engineering /Telecommunication (top 1%), Thesis Topic: "Estimation of Coronary Artery Dimensions in Angiograms.", University of Jordan, Amman, Jordan
01/1998-05/2002	PhD, Electrical & Computer Engineering (GPA:4.0/4.0), Thesis Topic: "Content-Based Image Retrieval by Similarity Learning for Digital Mammography.", Illinois Institute of Technology (IIT), Chicago, IL
05/2004-12/2007	MA, Biology (GPA: 4.0/4.0 GPA), Washington University in St. Louis (WUSTL), St. Louis, MO

Post-Doctoral Training

04/1996-10/1997	Visiting Scholar, Bioinformatics, RWTH Aachen, Aachen, Germany
08/2002-06/2005	Postdoctoral Fellow, Radiation Oncology/ Medical Physics, Washington University in St. Louis (WUSTL), St. Louis, MO

Certification And Licensure

Certification

11/2013-present	American Board of Radiology (ABR) - Medical Physics Therapeutics #P5495

Academic, Administrative, Clinical, Research and Military Appointments

Academic Appointments

07/2005-06/2007	Instructor, Washington University in St. Louis, St. Louis, MO
05/2007-06/2010	Adjunct Instructor, Washington University in St. Louis, St. Louis, MO
07/2007-06/2010	Assistant Professor, Washington University in St. Louis, St. Louis, MO
06/2008-05/2013	Faculty Member, Washington University in St. Louis, St. Louis, MO
06/2010-05/2015	Associate Professor in Oncology, McGill University, Montreal, QC Canada
02/2011-04/2019	Associate Member in Biomedical Engineering, McGill University, Montreal, QC Canada
07/2011-04/2019	Associate member in Physics, McGill University, Montreal, QC Canada
03/2012-05/2015	Associate Member in Experimental Medicine Division, McGill University, Montreal, QC Canada
05/2015-04/2019	Adjunct Professor, McGill University, Montreal, Quebec Canada
05/2015-present	Associate Professor in Radiation Oncology, University of Michigan - Ann Arbor, Ann Arbor, Michigan (Tenured)
05/2016-present	Affiliate member in Michigan Institute for Data Science (MIDAS), University of Michigan, Ann Arbor, MI
09/2016-07/2020	Affiliate in Applied Physics, University of Michigan - Ann Arbor, Ann Arbor, MI

05/2019-07/2020	Professor, University of Michigan, Ann Arbor, MI (Tenured)
07/2020-present	Chair of Machine Learning Department, Moffitt Cancer Center, Tampa, FL
07/2020-present	Associate member of Radiation Oncology, Moffitt Cancer Center, Tampa, FL
07/2020-08/2021	Adjunct Professor in Radiation Oncology, University of Michigan - Ann Arbor, Ann Arbor, Michigan
10/2020-present	Professor, Oncological Sciences, University of South Florida, Tampa, FL
10/2021-present	Associate faculty of Physics and Medical Engineering, Courtesy Faculty, USF, Tampa, FL
05/2022-present	CDSC interim Director Moffitt Cancer Center, Tampa, FL, USA.

Clinical Appointments

04/2011-05/2015	Medical Scientist, Montreal General Hospital, Montreal, QC Canada

Industry

04/1995-03/1996	Software Engineer, Computer Engineering Bureau (CEB), Amman, Jordan

Clinical Interests

- Oncology
- Medical Physics

Research Interests

- Bioinformatics and outcome modeling: design and develop large-scale datamining machine/deep learning methods and software tools to identify robust biomarkers of oncology treatment outcomes from clinical and preclinical data using complex systems analysis and machine learning approaches (radiogenomics).
- Multimodality image-guided targeting and adaptive oncology: design and develop hardware tools and software algorithms for multimodality image analysis and understanding, feature extraction for outcome prediction (radiomics), real-time treatment optimization and targeting.
- Clinical decision support: develop and design methods and tools for reinforcement machine learning and optimization of decision making for oncology.
- Medical physics radiation measurement: design and develop new technologies for radiation using optical and acoustics techniques to interrogate radiation response in real time for online targeting and adaptation.
- Radiobiology: design and develop predictive models of tumor and normal tissue response to radiotherapy (radiogenomics). Investigate the application of these methods to develop therapeutic interventions for protection of normal tissue toxicities.

Grants

Current Grants

1R01CA266803-01A1: An Ionizing Radiation Acoustics Imaging (iRAI) Approach for guided Flash Radiotherapy
NIH
El Naqa (Moffitt), Wang (Michigan), Bortfeld (Harvard), PI
09/2022-08/2027. $3,309,851 ($461,387)

R01CA233487-05S1: Federated Learning for Optimal Decision Making in Radiotherapy Using Panomics Analytics (Supplement)

NIH
El Naqa, PI
09/2022-05/2023. $158,678 ($51,609)

DoD-CDMRP-PCRP W81XWH-22-1-0277: Data Science to Improve Treatment Planning for Advanced Prostate Cancer Patients Treated with Radiotherapy
DoD-CDMRP-PCRP
Jim, H., El Naqa, I, PI
06/2022-05/2025. $690,912 ($280,875)

R01CA233487: Optimal Decision Making in Radiotherapy Using Panomics Analytics
NIH
El Naqa, Issam, PI
06/2019-05/2024. $2,256,535 ($451,307)

R37CA222215: Combined radiation acoustics and ultrasound imaging for real-time guidance in radiotherapy
NIH/NCI
El Naqa, Issam, PI
09/2018-07/2025. $1,473,869 ($615,194)

5P30CA076292: Moffitt Cancer Center Support Grant (CCSG) Years 24-27
NIH
Cleveland, J, Kanetsky, P, Kissil, J, Brandon, T, Conejo-Garcia, J, Duckett, D, Gray, J, Jim, H, Locke, F, Springer, B, Vadaparampil, S, Wright, K
02/2022-01/2027. $20,274,154 ($8,241,996)

AWD101462-M Medical Imaging and Data Resource Center (MIDRC) for Rapid Response to COVID- 19 Pandemic
NIBIB/NIH Contract 75N92020D00021-PTE: University of Chicago
Contact PI: Giger, M.; Subcontract: El Naqa, Co-PI
08/2020-04/2023. $111,411 ($43,763)

21B12 Non-invasive radiomic biomarkers to predict treatment response for immunotherapy of lung cancer
FBRP
Schabath, M., PI, El Naqa, I, Co-Inv
06/2021-04/2026 $1,327,180 ($110,344)

5 R01CA249016 Radiomics and Pathomics to Predict Upstaging of DCIS
NIH/NCI
Niell, B., Raghunand, N., Damaghi, M. (El Naqa, Co-Inv)
05/2021-04/2026 $3,416,848 ($1,289,101)

ORIEN NOVA M2Gen Team Science Award-Predictors of Immunotherapeutic Benefits in Patients with Advanced Malignancies Treated with Immune Checkpoint Inhibitors
Tampa Community Foundation (PTE: ORIEN)
PI: Tarhini, A. (Co-Inv: El Naqa, I)
06/2021-06/2023 $316,736 (47,926)

R03 CA259873 A framework to integrate live-cell imaging with single-cell sequencing and learn how cells adapt to new environments
NIH/NCI
PI: Andor, N., Heiser, L. (Co-Inv: El Naqa, I)
12/2021/-11/2023 $179,479 ($45,302)

R37 CA266727-01A1 Characterizing cytotoxic therapy induced shifts in the cost-to-benefit ratio of high ploidy
NIH/NCI
PI: Andor, N., (Co-Inv: El Naqa, I.)

09/2022-08/2027 $2,651,364 ($1,077,854)

Artificial Intelligence for Effective MR-Linac Adaptive Radiotherapy
VIEWRAY Technologies, Inc.
PI: El Naqa, I., Rosenberg, S.
10/2022-10/2024 $72,427 ($24,972)

Pending

1R21 CA269415-01A1 Engineering Model-Based Systems to Monitor and Steer Subclonal Dynamics
NIH
PI: Andor, N. (Co-Inv: El Naqa, I)
10/2022-10/2024 $463,375

R01 Charting, forecasting and reversing glioma cell infiltration into the brain parenchyma
NIH/NCI
PI: Andor, N., Gomes, A. (Co-Inv: El Naqa, I)
09/2023-08/2028 $3,928,064

U01 The Florida Pancreas Collaborative: Integrating Imaging and Molecular Biomarkers for the Early Detection of Pancreatic Cancer and its Highgrade Precursors
NIH/NCI
PI: Permuth, J., El Naqa, I.
12/2023-11/2028 $5,055,000

1 U54 CA274507-01A1 The Delta Ecology of NSCLC Treatment
NIH/NCI
Anderson, A., Gatenby, R., Marusyk, A., Brown, J., Enderling, H. (Co-Inv: El Naqa, I)
07/2023-06/2028 $12,637,500

U01 CA200464-06A1 Quantitative Imaging Clinical Validation Center at Moffitt Cancer Center
NIH/NCI
Heine, J., Schabath, M. (Co-Inv: El Naqa, I)
04/2023-03/2028 $6,217,583

Creation of an Infrastructure to Support Delivery of mHealth Interventions for Cancer Patients Throughout Florida
Florida Biomedical Research Program (FBRP)
Vidrine, D., Simmons, V., (Co-Inv: El Naqa, I.)
03/2023-02/2026 $1,498,230

R01 Radiomic biomarkers for clinical decision support that predict patient outcomes in serous ovarian carcinoma
NIH/NCI
Peres, L., Schabath, M., Cannioto, R. (Co-Inv: El Naqa)
09/01/2023-08/31/2028 $3,892,001

Past Grants

09-33426-22-01: Geriatrics Oncology Research
Moffitt Cancer Center Foundation
Extermann, M. (Co-Inv: El Naqa)
07/01/2021-06/30/2023 $100,000

3T32CA233399-03S1: Cancer research workforce development in FAIR Artificial Intelligence learning
NIH
Co-I (Principal Investigator: Cress, Flores, Fridley)

09/2021-08/2022. $86,337 ($86,337)

R41 CA243722: Cerenkov Multi-Spectral Imaging (CMSI) for Adaptation and Real-Time Imaging in Radiotherapy
NIH: (PTE: Endectra LLC)
Issam El Naqa, PI
08/2020-11/2021. $400,000 ($195,000)

Characterization of Radioacoustics for Radiotherapy Targeting
MCUBE
Martha Matsuzak, Issam El Naqa, Sara Pozzi, Co-PI
09/2018-12/2020. $60,000 ($30,000)

RR1843: Combining Genomic and Clinical/Dosimetric Variables to Predict Radiation Toxicity in Localized Prostate Cancer Patients Via Computational Genomics and Machine Learning
RSNA Research Resident Grant
Co-I without Effort (Principal Investigator: John Kang)
07/2018-06/2019. $30,000 ($30,000)

G017459: Can Listening to Radiotherapy Improve Real-time Targeting?
Stuart and Barbara Padnos Research Fund/Cancer Center
I. El Naqa, PI
12/2015-11/2016. $50,000 ($50,000)

Startup Fund
UM
I. El Naqa, PI
05/2015-04/2018. $600,000 ($200,000)

MOP-324855: Hybrid Imaging for Radiotherapy
CIHR
I El Naqa, PI
07/2014-06/2018. $394,720 ($98,680)

5 P01 CA059827-20: OPTIMIZATION OF HIGH DOSE CONFORMAL THERAPY
NIH-DHHS-US- 13-PAF01194
Co-I with Effort (Principal Investigator: Randall K Ten Haken)
05/2014-04/2019. $13,731,090 ($2,723,793)

Système intégré de macro et micro-imageries pulmonaires avec rehaussement intelligent en temps-réel in vivo dans le diagnostic et le monitorage de l'inflammation et de la réparation du SDRA RBIQ
Co-I (Principal Investigator: O. Lesur)
05/2014-05/2015. $50,000 ($50,000)

Nanoparticle-aided radiation therapy with scintillating high Z materials
CIHR Co-I
(Principal Investigator: J. Nadeau)
04/2014-03/2017. $475,800 ($158,600)

CREATE-298191: Medical Physics Research Training Network (MPRTN)
NSERC
Co-I (Principal Investigator: J. Seuntjens)
06/2013-05/2019. $1,650,000 ($275,000)

Nanosensors for Realtime Imaging in Radiotherapy (discovery grant)
McGill Collaborative Research and Development Fund
I. El Naqa, PI

07/2012-06/2013. $15,000 ($15,000)

Computational and Systems Radiobiology Infrastructure for Biomarker Discovery and Radiosignalling Modeling of Radiation-induced Normal Tissue Toxicities in Cancer Patients
Canada Foundation for Innovation
I. El Naqa, PI
07/2012-06/2013. $291,910 ($97,303)

MOP-114910: Modelling of radiotherapy Induced Damage in Locally Advanced Lung Cancer by a Novel System Radiobiology Approach
Canadian Institutes of Health Research (CIHR)
I El Naqa, PI
07/2011-06/2016. $675,000 ($135,000)

A real-time framework for image-guided adaptive radiotherapy
Natural Sciences and Engineering Research Council of Canada (NSERC)
I. El Naqa, PI
04/2011-05/2015. $399,000 ($57,000)

Start Fund
Fast Foundation and MUHC
I. El Naqa, PI
06/2010-05/2013. $150,000 ($50,000)

Startup Fund
McGill University startup fund
I. El Naqa, PI
06/2010-05/2013. $225,000 ($75)

Intra-Tumoral Metabolic Heterogeneity of Cervical Cancer
NIH
Co-I (Principal Investigator: Perry Grigsby)
12/2008-06/2010. $1,250,000 ($250,000)

FLT-PET as a Biomarker of Radiotherapy Response in Lung Cancer
Barnes Jewish Foundation
I. El Naqa, PI
07/2008-06/2010. $200,000 ($100,000)

K25CA128809: Predicting Radiotherapy Outcomes by Combining Physical and Biological Factors
NIH
I. El Naqa, PI
04/2008-06/2010. $480,000 ($120,000)

RO1CA116712: Positron Emission Tomography for Radiation Therapy
NIH
Co-I (Principal Investigator: Daniel Low)
08/2007-06/2010. $1,250,000 ($250,000)

IRG-58-010-50: Concurrent Multimodality Image Analysis for Radiotherapy Treatment Planning
American Cancer Society
I. El Naqa, PI
11/2006-10/2007. $20,000 ($20,000)

R01 HL074019: Quantification of Regional Myocardial Oxygenation by MRI
NIH
Co-I (Principal Investigator: Jie Zheng)
04/2005-03/2009. $1,250,000 ($250,000)

R01 EB00475901: MRI-Based Computational Modeling for Carotid Plaque Rupture and Stroke
NIH
Co-I (Principal Investigator: Woodward/Tang)
09/2004-08/2009. $1,250,000 ($250,000)

Honors and Awards

International

1996	Awarded Deutscher Akademischer Austauschdienst (DAAD) scholarship Germany
2006	Featured Article by PMB (DREES) and editorial article citation on www. medicalphysicsweb.com by Belle Dumé entitled "Software unravels radiation responses", published Dec 7 2006.
2006	Special recognition at the American Association of Physicists in Medicine (AAPM) by presenting at the Laughlin Science Council Research Symposium: Multi-modality image fusion entitled "Concurrent Multi-Modality Image Segmentation," Orlando, FL.
2007	Medical Physics cover figure from "Concurrent Multimodality Image Segmentation by Active Contours for Radiotherapy Treatment Planning" article.
2008	Press release in the SCIENCE HIGHLIGHTS of the 50th AAPM Meeting in Houston, about our talk for tracking tumor changes during radiotherapy entitled "New Technique to Estimate Lung Tumor Changes" written by Kathy Svitil. The article was also featured on the website: www.medicexchange.com.
2008	Special recognition at the American Association of Physicists in Medicine (AAPM) by selection for presentation at the Laughlin Science Council Research Symposium: entitled "4DCT motion estimation and modeling," by Yang et al. (post-doc trainee) Houston, TX.
2010	Special recognition at the American Association of Physicists in Medicine (AAPM) by selection for presentation at the Laughlin Science Council Research Symposium: entitled " Image-Based Scoring of Radiation Injury in Lung for Dose-Effect Correlations: Analysis of Sources of Uncertainties," by Lee et al. (graduate student with Dr Seuntjens) Philadelphia, PA.
2011	Featured editorial by Jonathan Evans entitled "Dead ends point the way: finding robust biomarkers in limited proteomics data," (www.separationsnow.com) on article "A Bioinformatics Approach for Biomarker Identification in Radiation-Induced Lung Inflammation from Limited Proteomics Data," Oh et al., JPR, 2011.
2011	Poster award nomination (Top 30) "Integrating dosimetry and biomarkers via a Bayesian network for predicting radiotherapy response in lung cancer," ESTRO.
2012	Medical Physics journal "Outstanding Reviewer of 2012".
2012	Red journal "Outstanding Reviewer of 2012".
2012	Times Higher Education World University Rankings: Thomson Reuters Academic Reputation Survey invitee
2013	Physics in Medicine and Biology "Top 25 reviewers in 2013."
2013	Red journal "Outstanding Reviewer of 2013". Certificate of Excellence.
2013	Special recognition at the American Association of Physicists in Medicine (AAPM) by selection for presentation at the Laughlin Science Council Research Symposium: entitled " Joint FDG-PET/MR Imaging for the Early Prediction of Tumor Outcomes," by Vallieres et al. (PhD student) Indianapolis, IN, 2013
2013	Times Higher Education World University Rankings: Thomson Reuters

	Academic Reputation Survey invitee
2014	ASTRO 2014 highlights Vallieres et al on "Image analysis predicts therapy response" (http://medicalphysicsweb.org/cws/article/research/58949)
2014	Basic Science Abstract Award, ASTRO, "Shining Light On the Implementation of Cherenkov Emission in Radiation Therapy," Zlateva et al. (PhD student), San Francisco, CA.
2014	Best in Physics at AAPM (Therapy category), "Radiogenomic Modeling of Normal Tissue Toxicities in Prostate Cancer Patients Receiving Hypofractionated Radiotherapy," Coates et al. (Undergrad student), Austin, TX, 2014. A subsequent editorial on by Tammi Freeman (http://medicalphysicsweb.org/cws/article/research/58084).
2014	Best in Physics at ASTRO, "Radiogenomic Modeling of Normal Tissue Toxicities in Prostate Cancer Patients Receiving Hypofractionated Radiotherapy," Coates et al. (Undergrad student), San Francisco, CA.
2014	J.R. Cunningham Young Investigator Symposium (1st place award), COMP, "Radiogenomic Modeling of Normal Tissue Toxicities in Prostate Cancer Patients Receiving Hypofractionated Radiotherapy," Coates et al. (Undergrad student), Banff, AB.
2014	Radiotherapy and Oncology "Outstanding Reviewer Award 2014."
2014	`John R. Cameron Young Investigator Symposium at AAPM (1st place award), "Feasibility of X-Ray Acoustic Computed Tomography as a Tool for Calibration and In Vivo Dosimetry of Radiotherapy Electron and Photon Beams," Hickling et al. (MS student), Austin, TX.
2015	Best in Physics at AAPM (Therapy category), "Cherenkov Emission Dosimetry: Feasibility for Electron Radiotherapy." Zlateva & El Naqa, (PhD student), Anaheim, CA, 2015.
2015	Editor's Choice, PMB: M Vallières, C R Freeman, S R Skamene and I El Naqa, "A Radiomics model from joint FDG-PET and MR texture features for prediction of lung metastases in soft-tissue sarcomas of the extremities, PMB, Jul 7;60(14):5471-96, 2015.
2015	IOMP Young Investigator, "Cherenkov emission dosimetry for electron beam radiotherapy: a Monte Carlo feasibility study of absolute dose prediction," Zlateva & El Naqa, (PhD student), World Congress on Medical Physics & Biomedical Engineering.Toronto, ON, 2015.
2015	John R. Cameron Young Investigator Symposium at AAPM, ""Temporally Realistic Manipulation a 4D Biomechanical Lung Phantom for Evaluation of Simultaneous Registration and Segmentation." Markel et al., Anaheim, CA, 2015.
2015	Reader's Choice, Med Phys: Sangkyu Lee, Norma Ybarra, Krishinima Jeyaseelan, Jan Seuntjens, and Issam El Naqa, "Bayesian Network ensemble as a multivariate strategy to predict radiation pneumonitis risk." Medical Physics, Med. Phys. () 42, 2421 (2015)
2016-present	IEEE Senior member
2016	Best in Physics at ASTRO (highest ranked abstract), "Reinforcement Learning Strategies for Decision Making in Knowledge-based Adaptive Radiotherapy: Application in Liver Cancer," Boston, MA, 2016.
2016	ICCR top rated abstracts: Y Luo, I El Naqa, D McShan, M Schipper, M. Matuszak, M Stenmark, I Lohse, D Ray, D Owen, S Jolly, T Lawrence, FM Kong, R Ten Haken "A Bayesian Network Approach for Local Progression Prediction in Lung Cancer with Large- Scale Retrospective Data,"
2016	J.R. Cunningham Young Investigator Symposium , COMP, ": Imaging dose

	distributions through the detection of radiation-induced acoustic waves," Hickling et al. (PhD student), St. Johns, NewFoundLand, 2016.
2016	J.R. Cunningham Young Investigator Symposium , COMP, "Modelling Lung SBRT Treatment Outcomes using Bayesian Network Averaging," Boustead et al. (PhD student), St. Johns, NewFoundLand, 2016.
2016	J.R. Cunningham Young Investigator Symposium, COMP, "Stopping power---to--- Cherenkov power ratios and beam quality specification for clinical Cherenkov emission dosimetry of electrons: beam-specific effects and experimental validation," Zlateva et al. (PhD student), St. Johns, New Found Land, 2016.
2017-present	AAPM Fellow “for contributions to medical physics”
2017	Editor's Choice article: Hickling et al. "Experimental evaluation of x-ray acoustic computed tomography for radiotherapy dosimetry applications,"Med Phys.
2017	Featured article (Editor's choice): Tseng et al. " Deep reinforcement learning for automated radiation adaptation in lung cancer," Med Phys
2017	Special recognition at the American Association of Physicists in Medicine (AAPM) by Selection for the Laughlin Science Council Research Symposium on "Big Data, Deep Learning, and AI in Imaging and Radiation Oncology" entitled " Machine Learning for Automated Quality Assurance in Radiotherapy" I. El Naqa*, J. DeMarco, H. Al-Hallaq, J. Booth, T. Ritter, G. Kim, S. Park, R. Popple, M. Perez, K. Farrey, J. Moran
2017	Special recognition at the American Association of Physicists in Medicine (AAPM) by Selection for the Laughlin Science Council Research Symposium on "Big Data, Deep Learning, and AI in Imaging and Radiation Oncology" entitled: A Multi-Objective Dynamic Bayesian Network Approach for Adaptive Personalized Radiotherapy in Non-Small-Cell Lung Cancer (NSCLC) Y. Luo*, D. McShan, R. Ten Haken, I. El Naqa
2018	Best in Physics at ASTRO "Prediction of Local Control in Non-small Cell Lung Cancer Patients after Radiotherapy by Composite Deep Learning Neural Networks," Cui et al., San Antonio, TX, 2018
2018	Best in Physics/Invited expert at ASTRO "Modeling of Locoregional Control in Hepatocellular Carcinoma After Stereotactic Body Radiation Therapy by Integrating Clinical and Immune Cell Profiles," El Naqa el al, San Antonio, TX, 2018
2018	Editor's Choice: Luo et al "A multiobjective Bayesian networks approach for joint prediction of tumor local control and radiation pneumonitis in nonsmall-cell lung cancer (NSCLC) for response-adapted radiotherapy," Med Phys, 2018
2018	Farrington Daniels Award for best paper published in Medical Physics in 2017 for, " Deep Reinforcement Learning for Automated Radiation Adaptation in Lung Cancer," Medical Physics 44 (12), 6690-6705 (2017).
2018	Featured Article (CME): El Naqa et al "Modeling of Normal Tissue Complications Using Imaging and Biomarkers After Radiation Therapy for Hepatocellular Carcinoma," nt J Radiat Oncol Biol Phys
2018	PMB 2018 Rotblat Medal for most citations of paper: "radiomics model from joint FDG- PET and MRI texture features for the prediction of lung metastases in soft-tissue sarcomas of the extremities"
2018	PMB highlights of 2017: “Radiogenomics and radiotherapy response modeling”
2018	Special recognition at AAPM, Science Council-Advances in Imaging Technology-Presentation by Wei Zhang "X-Ray Induced Acoustic Imaging for Real-Time in Vivo Dosimetry During External Beam Radiotherapy: A Feasibility Study in a Soft-Tissue Phantom"

2019-2020	Medical Physics Top Downloads (3 papers)
2019	Editor's Choice in Med Phys "Cherenkov emission-based external radiotherapy dosimetry: Formalism and feasibility" Zlateva et al.
2020	AAPM GLC (1st place award) and best in therapy AAPM Physics (Ba Sunbal et al., iRAI for in vivo FLASH Dosimetry, 2020)
2020	Editor's Choice "Quantum-inspired algorithm for radiotherapy planning optimization" Med Phys, Pakela et al.
2020	Medical Physics Cover for Special Issue in Medical Physics: Special Issue On Datasets Hosted in the Cancer imaging Archive
2020	Medical Physics Cover for Special Issue in Medical Physics: The Role of Machine and Deep Learning in Modern Medical Physics
2020	NRG Publication Award "NCTN Assessment on Current Applications of Radiomics in Oncolog," IJROBP, Nie et al
2020	Physics World highlights of the year for "Real-time dosimetry for FLASH radiotherapy"
2021	IEEE Fellow “for contributions to AI/ML in medicine and imaging”
2021	Distinguished Associate Editor of Medical Physics
2021	Editor Choice Physica Medica, Luo et al, "A situational awareness Bayesian network approach for accurate and credible personalized adaptive radiotherapy outcomes prediction in lung cancer patients"
2021	Michael S. Patterson Publication Impact Prize in Medical Physics for 2021 (Vallieres, 2015).
2022	CAS Fellow in Next Generation AI, Ludwig Maximilian University of Munich, Germany
2023	AIMBE Fellow “for contributions to AI/ML in medical imaging and treatment outcome modeling”

National

1998	Awarded El-Hijawii (1st place) for scientific research for young investigators. For an Article (El Naqa et al., 1996) and a computer software in Visual Basic for detection of coronary artery dimensions, Jordan.
2012-2015	CIHR (Canadian Institutes of Health Research) New Investigator Salary Award (2012- 2017), 60K/yr.
2012-2015	FRSQ (Fonds de la recherche en santé du Québec) Salary Award (2012-2016), 70K/yr. (Ranked#1 in the competition), supplement covered.
2012	Student first prize at the Canadian Society for Chemical Engineering (CSChE) for Non- invasive Plethysmography by James Coates et al. (undergrad with Dr Leask). Finalist for the James Dawson award, 2012.
2016	Best Poster Award at the Toronto International Sarcoma Symposium for "FDG-PET, FMISO-PET, DW-MRI and DCE-MRI in the management of soft tissue sarcomas of the extremities" By C freeman et al.
2019	Congressional recognition letter (12th district, MI)

Institutional

1999	Awarded Excellence in Laboratory Teaching from IIT.
2000	Awarded Excellence in Laboratory Teaching from IIT.
2002	Highest Academic Achievement Award, ECE PhD, IIT
2006	Nominated via internal competition to represent Washington University/ School of Medicine in Pfizer's New Scholar's Grants in Clinical Epidemiology for the Award.

2007	Highest Academic Achievement Award, Biology MA, WUSTL
2020	Moffitt Distinguished scholar
2020	Teacher of the year, Department of Radiation Oncology, University of Michigan, Radiation Physics

Memberships in Professional Societies

1999-present	Fellow, Institute of Electrical and Electronics Engineers (IEEE)
2002-present	Fellow, American Association of Physicists in Medicine (AAPM)
2003-present	Member, American Society for Therapeutic Radiology and Oncology (ASTRO)
2007-present	Member, European Society for Therapeutic Radiology and Oncology (ESTRO)
2013-2015	Member, Canadian Organization of Medical Physicists (COMP)
2018-present	Member, Radiation Research Society
2020-present	Member, American Association for Cancer Research (AACR) 2021-present Member, American Society of Clinical Oncology (ASCO)
2023-present	Fellow, American Institute for Medical and Biological Engineering (AIMBE)

Editorial Positions, Boards, and Peer-Review Service Study Sections

International

2010	European Research Program (Ad Hoc)
2012	Medical Research Council (MRC), UK (Ad Hoc)
2013	Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO) (Ad Hoc)
2013	The Dutch research agency Technology Foundation (STW) (Ad Hoc)
2014-2017	Committee member of the NSERC Physics Evaluation Group for Discovery Grants
2014	Qatar National Research Fund (Ad Hoc)
2015	Institut national de la santé et de la recherche médicale (INSERM) (Ad Hoc)
2015	Kinderen Kankervrij, Netherland (Ad Hoc)
2015	Prostate Cancer Canada (PCC) (Ad Hoc)
2017	France-ANR (Ad Hoc)
2017	Kika Foundation, Netherland (Ad Hoc)
2018	CIHR--Program Projects (Ad Hoc)
2018	Canadian Cancer Society (Ad Hoc)
2018	Swiss National Science Foundation (Ad Hoc)
2019	German Research Foundation (DFG) (Ad Hoc)
2020	German DFG (Ad Hoc)
2021	France-ANR (Ad Hoc)

National

2012	Canadian Institutes of Health Research (CIHR): Terry Fox Team Research Program (Ad Hoc)
2013-2014	CIHR: Fellowship and training program
2013	Canadian Cancer Society Research Institute (CCSRI) (Ad Hoc)
2013	Natural Sciences and Engineering Research Council of Canada (NSERC): External reviewer, Physics Panel, 2013 (Ad Hoc)
2017	Memorial Sloan Kettering Foundation (Ad Hoc)
2017	NASA panel: Space Radiobiology and Human Health Countermeasures (SRHHC) (Ad Hoc)
2019-present	NIBIB (Ad Hoc)

2019-present	NIH (BCHI) (Ad Hoc)
2019	NASA: Space Radiobiology and Human Health Countermeasures (SRHHC) (Ad Hoc)
2019	NIH (NIAID): Special Emphasis Panel on Radiation Biodosimetry Assays and Devices (U01) (Ad Hoc)
2020	NASA SRDB Panel (Ad Hoc)
2020	NIH- SBIR (Ad Hoc)
2020	NIH-ITCR (Ad Hoc)
2020	NIH-P01 (Ad Hoc)
2020	NIH-PSE (Ad Hoc)
2020	NIH-SPORE (Ad Hoc)
2021	NASA-EPSCOR (Ad Hoc)
2021	NASA: Space Radiobiology and Human Health Countermeasures (SRHHC) (Ad Hoc)
2021	NIH-EITA (Ad Hoc)
2021	NIH-RTB (Ad Hoc)
2022-2026	NIH-RTB chartered study section member

Regional

2018-present	Endectra, LLC Scientific Advisory Board (Ad Hoc)

Institutional

2013-2015	MUHC Research Ethics Board (REB) (Ad Hoc)
2014	McGill Collaborative Research Grants (Ad Hoc)
2019	MICHR (Ad Hoc)

Editorial Boards

2009-present	Editorial Board Member, Radiation Oncology informatics journal
2011-2015	Editorial Board Member, American Journal of Science and Engineering
2012-2017	Editorial Board Member, ISRN Radiology
2013-2018	Associate Editor, Medical Physics
2013-2018	Senior Associate Editor, Red Journal
2014-2017	Editorial board, Computational and Mathematical Methods in Medicine
2016-present	Associate Editor, Frontiers in Oncology
2017-2018	Guest Co-Editor, Special Issue Guest Editor for IEEE Transactions on Radiation & Plasma Medical Sciences Special issue on Machine learning in radiation based medical sciences. M. Hatt, C. Parmar, I. El Naqa
2017-2018	Guest Co-editor, Frontier in Oncology Guest Editor on Machine Learning with Radiation Oncology Big Data. Jun Deng, Issam El Naqa, Lei Xing
2017-present	Associate editor, Karger Oncology
2017-present	Guest Co-editor, Special Issue Guest Editor in PMB: Data sciences in medical physics: imaging and beyond Issam El Naqa and Robert Jeraj
2017-present	Guest editor, IEEE Transactions on Radiation and Plasma Medical Sciences
2018-present	Artificial Intelligence--Section Editor, British Journal of Radiology (BJR)-- Open Access
2018-present	Associate editor, Frontiers in Big data
2018-present	Data Articles--Section Editor, Medical Physics
2018-present	Guest- Co-editor, Special Issue in Medical Physics: The Role of Machine and Deep Learning in Modern Medical Physics I. El Naqa and S Das
2018-present	International Advisory Board, Physics in Medicine and Biology (PMB)
2018-present	Senior editor, IEEE Transactions on Radiation and Plasma Medical Sciences
2019-present	Senior Associate Editor, Physica Medica
2020-present	AI Senior editor, British Journal of Radiology (BJR)
2021-present	Deputy Editor, Medical Physics

Journal Reviewer

2002-present	Academic Radiology (Ad Hoc)
2002-present	Digital Imaging (Ad Hoc)
2002-present	IEEE Fuzzy logic systems and transactions on Fuzzy systems (Ad Hoc)
2002-present	IEEE Image and Signal Processing Society (Ad Hoc)
2002-present	IEEE Transactions on Medical Imaging (Ad Hoc)
2002-present	IEEE Transactions on Neural Networks (Ad Hoc)
2002-present	IEEE Transactions on Systems, Man, and Cybernetics, Part A: Systems and Humans (Ad Hoc)
2004-present	Medical Physics (Ad Hoc)
2004-present	Physics in Medicine and Biology (Ad Hoc)
2005-present	AAPM (Ad Hoc)
2005-present	Computer Methods and Programs in Biomedicine (Ad Hoc)
2005-present	Medical & Biological Engineering & Computing (Ad Hoc)
2005-present	Pattern recognition (Ad Hoc)
2006-present	ASTRO (Ad Hoc)
2006-present	Radiotherapy & Oncology (Ad Hoc)
2007-present	International Journal of Radiation Oncology*Biology *Physics (Ad Hoc)
2007	ESTRO (Ad Hoc)
2008-present	Artificial intelligence in Medicine (Ad Hoc)
2009-present	Journal of Nuclear Medicine (Ad Hoc)
2010	BMC Bioinformatics (Ad Hoc)
2010	BMC Medical Physics (Ad Hoc)
2011-2015	COMP (Ad Hoc)
2011	Proteome Science (Ad Hoc)
2014-present	International Journal of Proteomics (Ad Hoc)
2014-present	PLOS ONE (Ad Hoc)
2016-present	Nature Scientific reports (Ad Hoc)
2017-present	Cancer Research (Ad Hoc)
2017-present	Clinical Cancer Research (Ad Hoc)
2017-present	IEEE NSS-MIC review committee (Ad Hoc)
2017-present	Scientific Reports, Nature (Ad Hoc)
2018-present	Lancet Oncology, Lancet digital Health (Ad Hoc)
2019-present	Cancer Research (Ad Hoc)
2019-present	Magnetic Resonance Imaging (Ad Hoc)
2019-present	Nature Communication (Ad Hoc)
2022	Cancer Discovery (Ad Hoc)
2022	Journal for ImmunoTherapy of Cancer - (Ad Hoc)
2023	PNAS

Teaching

Advanced Post Graduate Fellow

01/2011-05/2015	Norm Ybarra, PhD, McGill University

Graduate Student

09/2008-05/2010	Manushka Vaidya, Post-bac, Wash U
09/2008-06/2010	Wayne Majkowski, No degree, Wash U
06/2010-04/2016	Sangkyu Lee, PhD, McGill University
09/2011-06/2016	Daniel Markel, PhD, McGill University
09/2011-06/2016	Piotr Pater, PhD, McGill University
09/2011-01/2017	Martin Carrier-Vallieres, MS/PhD, McGill University
01/2012-01/2017	Jessica Perez, PhD, McGill University
05/2012-05/2019	Yana Zlateva, MS/PhD, McGill University
05/2013-05/2018	Susannah Hickling, MS/PhD, McGill

University
09/2014-05/2016 André Diamant Boustead, MS, McGill University
12/2015-05/2020 Sunan Cui, PhD, University Of Michigan
05/2016-05/2020 Lise Wei, PhD, University of Michigan
05/2017-05/2021 Julia Pakela, PhD, University of Michigan
09/2018-05/2022 Noora Ba Sunbul, PhD, University of Michigan, NERS with (Matsuzak and Pozzi)
06/2019-present Jamalina Jamaluddin, PhD, University of Michigan, NERS with (Matsuzak)
07/2022-present John Mayfield, Medical Engineering, PhD, USF
09/2022-present Jesutofunmi Fajemisin, Physics, PhD, USF

Medical Student

03/2008-09/2008 Yeamie Sheref, MD, Wash U
04/2018-present Mark Farha, MD, University of Michigan

Postdoctoral Fellow

03/2005-03/2007 Deshan Yang, Pos-doc, Wash U
03/2009-05/2010 Jung Hun Oh, Post-doc, Wash U
07/2011-09/2014 Ola Maria, Post-doc, McGill University
05/2015-08/2019 Yi Luo, Post-doc, University of Michigan with Dr Ten Haken
01/2016-present Ibrahim Oraiqat, Post-doc, University of Michigan
09/2016-08/2019 Huan-Hsin Tseng, PhD, University of Michigan, Ann Arbor
09/2018-present Dipesh Niraula, PhD, University of Michigan/Moffitt cancer Center
07/2021-07/2022 Payman Ghasemi, PhD, Moffitt Cancer Center
10/2021-07/2022 Almuthanna Nassar, PhD, Moffitt Cancer Center
02/2022-present Ruwani Fernando, PhD, Moffitt Cancer Center
07/2022-present Muhammad Alli, PhD, Moffitt Cancer Center
09/2022-present Denis Dudas, PhD, Moffitt Cancer Center
02/2023-present Palak Dave, PhD, Moffitt Cancer Center
03/2023-present Glebys Gonzales, PhD, Moffitt Cancer Center
03/2023-present Elaheh Sobhani, PhD, Moffitt Cancer Center

Resident/House Officer

03/2009-06/2010 Jeffrey Craft, MD/PhD, Wash U
08/2016-02/2017 Benjamin Rosen, PhD, University of Michigan, Ann Arbor
08/2018-09/2019 John Kang, MD PhD, University of Rochester, NY
10/2018-04/2019 Joo, Jaewook, Physics resident, University of Michigan

Undergraduate Student

05/2004-09/2004 Gita Suneja, Non Degree: Post-bac, Wash U
05/2008-09/2009 Damian Almiron-Bonin, Post-bac, Wash U
09/2008-05/2009 Sarah Spencer, BS Honor thesis, Wash U
05/2009-05/2010 Michelle Ju, Undergrad, Wash U
05/2009-05/2010 Rawan Al-Lozi, Post-bac, Wash U
02/2011-05/2015 Asha Xavier, RA, McGill University
03/2011-09/2011 Mohsen Ahanj, BS, McGill University
05/2012-09/2012 Grace Wang, BS, McGill University
05/2012-09/2014 James Coates, BS, McGill University
05/2012-09/2014 Sabastian Laberge, BS, McGill University

05/2013-09/2014	Jessie Tao, BS, McGill University
01/2015-05/2015	Tony Wang, BS, McGill University
09/2015-04/2016	Zack Chen, BS, University of Michigan
11/2021-present	Skylar Kyzer, USF

Visiting Scholars

05/2016-08/2016	Arthur Jochems, Post-doc, Maastro Clinic
09/2017-10/2017	Julie Constanzo, PhD, Dept. of Radiobiology, Hadrontherapy and Molecular Imaging, University of Strasbourg, France.

Teaching Activity

International

12/2010	Faculty member of the AAPM/ISEP: Taught a molecular imaging course sponsored by International Scientific Exchange Program (ISEP) of the AAPM at King Hussein Cancer Center, Amman, Jordan as part of the AAPM faculty.
01/2013	Teaching courses in medical physics imaging and radiobiology at the King Hussein Cancer Center, Jordan, Amman
02/2013	Faculty member at AMPI: Taught a course on "Monte Carlo role in radiobiological modeling of radiotherapy outcomes," SACR, Cochin, India
04/2013	Faculty member at ESTRO: Taught a course on "Statistical methods for fitting of response /biological models to clinical data," organized by the European Society of therapeutic radiation oncology (ESTRO) Forum, Geneva, Switzerland
10/2015	AAPM/ISEP: Taught courses on image guidance and radiobiology at King Fahd Medical Center, Saudi Arabia
04/2019	ESTRO pre-meeting Course on ML for Medical Physicists
07/2019	EU Institute for Research Development, Training and Advice (IRDTA) International Summer School on Deep Learning

National

10/2013	Development of e-tools of consensus contouring for ASTRO/ESTRO medical residents based on some of our previous software tools (CERR/DREES) and others that we provided for EduCase (coordinated by Mr Scott Kaylor).

Institutional

05/2000	Communication Electronics and Microcontroller Systems
05/2008-08/2008	ESE-501 - Mathematics of Modern Engineers I,WUSTL
09/2008-12/2008	JEM-3170 - Engineering Mathematics, WUSTL, UMSL
01/2009-05/2009	Biology 5011 - Ethics and Research Science, WUSTL,
DBBS 09/2009-12/2009	ESE-444 – Sensors and actuators, WUSTL, ESE
01/2010-05/2010	Biostatistics for Radiation Oncology Residents, WUSTL
09/2010-12/2014	MDPH 614 -Physics of Diagnostics Radiology, McGill
05/2011-08/2014	MDPH 702 –PhD seminar, McGill
09/2012	INDS-101 -CANCER & ONCOGENES small group, McGill
01/2015-05/2015	MDPH 609 – Radiation Biology Coordinator, McGill
06/2016-present	Residence physics course: Lecture on TCP/NTCP

03/2017-05/2019	Medical Residents: Imaging/TCP/NTCP (4 lectures)
03/2018-05/2018	Medical Residents: Imaging/TCP/NTCP (4 lectures)
03/2020-03/2021	430 Bioophysics: 2 lectures on radiotherapy
05/2022	FAIR AI, Moffitt (2 lectures)

Dissertation Committees

2014	Lennart Hilbert, Reverse engineering smooth muscle molecular mechanics, McGill University, Physiology, Chair
2016	Daniel Markel, Simultaneous Registration and Segmentation Coupling Using the Jensen Renyi Divergence for Adaptive Radiotherapy, McGill University, Physics, Co-Chair
2016	Jamie Dean, Spatial effects of radiotherapy dose-distribution in toxicity in head and neck cancer, Institute of Cancer Research, Royal Cancer Hospital, Committee Member
2016	Piotr Pater, NUMERICAL MODELS FOR RADIATION-INDUCED DNA DAMAGE, McGill University, Physics, Co-Chair
2016	Sangkyu Lee, System radiobiology modelling of radiation induced lung disease, McGill University, Physics, Chair
2016	Sarah A. Mattonen, Radiomics for Response Assessment after Stereotactic Radiotherapy for Lung Cancer, The University of Western Ontario, Medical Biophysics, Committee Member
2017	Jessica Perez, Molecular Imaging of Radiation-Induced Lung Injury, McGill University, Biomedical Engineering, Chair
2017	Martin Vallières, Radiomics: Enabling Factors Towards Precision Medicine, McGill University, Medical Physics, Co-Chair
2017	Sunan Cui, Investigating predictive models of tumor and normal tissue response to radiotherapy, University of Michigan, Ann Arbor, Applied Physics, Chair
2018	Hongki Lim, Quantitative image reconstruction and analysis methods for low signal-to- noise ratio emission tomography, University of Michigan, EECS, Committee Member
2018	Lise Wei, Deep Radiomics Feature Engineering and Model building: Application for Radiotherapy Guidance, University of Michigan, Ann Arbor, Applied Physics, Chair
2018	Noora Ba Sunbal, Radiation acoustics (MS), University of Michigan, NERS, Committee Member
2018	Susannah Hickling, Demonstration of x-ray acoustic computed tomography as a radiotherapy dosimetry tool, McGill University, Physics, Committee Member
2021	Ronrick Arnais Da-ano, Harmonization strategies for multicenter radiomics studies, Institut Brestois de la Recherche en Biologie-Santé, Laboratoire de Traitement de l'Information Medicale, Committee Member

Clinical Track Scholarly Contribution

Clinician-Research Scholar (translational science, clinical research, health services research)

Task group report, Berthon et al, Medical Physics, 2017: Toward a standard for the evaluation of PET-Auto- Segmentation methods following the recommendations of AAPM task group No. 211: Requirements and implementation.

Task group report, Hatt et al, Medical Physics, 2017: Classification and evaluation strategies of auto-segmentation approaches for PET: Report of AAPM task group No. 211.

Committee and Administrative Services

Committee Services
International

2005	Int. Conf. on Communications, Circuits and Systems (ICCCAS), Neural Networks and Computational Intelligence Track, Hong Kong, Member
2008	Applications of Machine Learning in Radiotherapy session, International Conference on Machine Learning and Applications (ICLMA) conference, San Diego, CA, Member
2014-2017	International Commission on Radiation Units and Measurements (ICRU) Report 100: Prescribing, Recording, and Reporting of Stereotactic Treatments with Small Photon Beams, Consultant
2014	Technical program committee, ICMLA, 2014, Detroit, MI, Member
2018-2019	19th International Conference on the use of Computers in Radiation Therapy (ICCR) in partnership with the 2nd International Conference on Monte Carlo Techniques for Medical Application (MCMA), Organizing Committee
2018-present	AI work group for Physics, Medicine & Biology, Member
2019-2020	7th IEEE International Conference on Data Science and Advanced Analytic (DSAA), Organizing Comittee and Chair of Data Science School
2019-present	ESTRO/ACROP: Validation of NTCP models for use in clinical treatment optimisation, Member
2019	ICCR/MCMA, Program committee member

National

2008-present	Biological Effects committee, AAPM, Member. (Vice chair, 2022)
2010	9th IEEE Southwest Symposium on Image Analysis and Interpretation (SSIAI 2010)., Member
2011-2018	AAPM Middle East Affairs Subcommittee, Member
2011-2018	AAPM Task Group No. 211 - Classification, Advantages and Limitations of the Auto- Segmentation Approaches for PET, Member
2011-present	Committee member of Working Group on Biological Effects of Hypofractionated Radiotherapy/SBRT, Subcommittee NTCP tasks co-leader
2013-present	Committee member of Pediatric Normal Tissue Effects in the Clinic (PENTEC), Member
2013	Technical program committee, ICMLA, 2013, Miami, FL, Member
2017-2018	NRG Radiomics Working Group, Member
2017-present	AAPM-Medical Physics Data Article Subcommittee, Chair
2017-present	Practical Big Data Workshop, Member
2018-present	AAPM-Machine Learning Subcommittee, Chair
2018-present	AAPM: Big Data, Radiomics, and Machine Learning (BRM) Steering Committee, Member
2019-present	AAPM Research Committee, Member
2020-present	AAPM/MIDRC, Member

Administrative Services

Volunteer

2007	Co-moderator, AAPM, Minneapolis, Minnesota, Co-chair of "Quantitative Imaging for Cancer" joint imaging/therapy scientific session
2009	Organizing Chair, ICMLA, Miami, Florida, Special session on Data Mining Methods for Modeling Treatment Outcomes in Cancer
2010	Organizing Chair, ICMLA, Washington, DC, Special session on Data Mining Methods for Modeling Treatment Outcomes in Cancer
2011	Co-organizer, Monte Carlo Workshop, Montreal, QC, Organizing committee for the 4th International Workshop on Recent Advances in Monte Carlo Techniques for Radiation Therapy
2012	Co-moderator, AAPM, Charlotte, NC, Co-moderator of "Biophysical modeling of outcomes" and "Innovative Imaging" sessions, AAPM
2012	Co-organizer, ICMLA, Honolulu, HI, Special session on Data Mining Methods for Modeling Treatment Outcomes in Cancer
2014	Co-moderator, AAPM, Austin, TX, Co-moderator of "Modeling of outcomes, AAPM
2014	Co-organizer, Monte Carlo Workshop, Quebec City, QC, Organizing committee for the 5th International Workshop on Recent Advances in Monte Carlo Techniques for Radiation Therapy
2014	Organizing Chair, ICMLA, Detroit, MI, Special session on Data Mining Methods for Modeling Treatment Outcomes in Cancer
2015	Co-moderator, AAPM, Anaheim, CA, Image feature analysis
2015	Track co-chair, World Congress on Medical Physics and Biomedical Engineering (WC2015), Toronto, Canada, Track Co-Chair for Track 19: Biophysics And Modelling
2016 Technologies	Discussant, ASTRO, Boston, MA, Physics - Innovative
2017 STUDIES	Co-moderator, AAPM, Denver, CO, DOSE RESPONSE
2017	Co-moderator, AAPM, Denver, CO, RADIOMICS AND IMAGE ANALYSIS
2017	Co-organizer, AAPM, Denver, Co, Machine Learning Role in Radiomics and Radiogenomics
2017	Member of the Organizing committee, Practical Big Data Workshop, Ann Arbor, MI, Workshop on big data sponsored by AAPM
2018-present	Scientific Advisor, EORTC, Brussels, Belgium, Scientific Advisor on AI in Oncology Working group 3
2018	Co-moderator, ESTRO, Barcelona, Spain, Poster viewing 6: Radiobiology
2018	Discussant, AAPM, Nashville, TN, "Novel Computing Applications in Imaging and Therapy" Joint Imaging-Therapy ePoster Campus session
2018	Discussant, ASTRO, San Antonio, Texas, Digital Health Information & Informatics - ePoster Discussion
2018	Member of the organizing committee, Practical Big Data Workshop, Ann Arbor, MI, Workshop on Big data sponsored by AAPM
2019	Co-chair, NCI Workshop on AI in Radiation Oncology, Rockville, Maryland, Co-chair for a NCI/AAPM/ASTRO/RSNA sponsored meeting
2019	Moderator, AAPM, San Antonio, TX, In-Vivo and Real-Time Dosimetry Therapy Scientific Session

2019	Moderator, ASTRO, Chicago, IL, Physics 1-Special Session 1: Outcome Analysis and Modeling
2019	Moderator, ICCR, Montreal, QC, Canada, - Microdosimetry & Applications in Radiotherapy I - Outcomes and Radiobiological Applications II - Deep Learning (II) Image Processing
2020	Co-Organizer, AAPM/COMP, Vancouver, CA (Virtual), Session on Thunder and Light (ning): Applications and Potential of Radiation Acoustics and Optics
2021	Discussant, NCI-DOE, Virtual, Workshop on AI in Radiation Oncology
2021	Moderator, AAPM, Virtual, Moderator
2021	Moderator, ASTRO, Chicago, IL, Moderator
2022	Session Organizer, AAPM, Washington, DC, Integrating omics in the era of AI for better patient specific outcomes.

Consulting Positions

01/2018-present	Scientific advisor, Endectra, LLC, Ann Arbor, MI

Visiting Professorships and Extramural Invited Presentations

Visiting Professorships

04/2017	Radiotherapy Outcome Modeling in the Era of Pan-Omics, University of Chicago, April 2017, Chicago, IL
01/2018	The Role of Deep Machine Learning in Radiotherapy, UTSW, January 2018, Dallas, TX
05/2019	Artificial Intelligence and the New Radiation Oncology Clinic, University of Maryland, May 2019, Baltimore, MD
04/2021	Towards Patient-centered Machine Learning in Radiation Oncology, Department of Radiation Physics at MD Anderson Cancer Center, April 2021, Online
02/2022	Artificial Intelligence – An Emerging Trend in Radiation Oncology, University of California at San Francisco, February 2022, Virtual
10/2022	CAS fellow, LMU, Munich, Germany

Extramural Invited Presentations

1. Computer Modeling in Radiation Therapy, UT Southwestern Medical Center, August 2004, Dallas, TX
2. Role and Challenges for Computational Modeling in Radiation Oncology, McGill University, February 2008, Montreal, Canada
3. Clinical Prospects and Technological Challenges for Multimodality Imaging Applications in Radiotherapy Treatment Planning, South Western AAPM Spring Meeting, April 2008, Austin, TX
4. Clinical Prospects and Technological Challenges for Multimodality Imaging Applications in Radiotherapy Treatment Planning, Department of Radiation Oncology, University of California at San Diego, April 2008, Webex
5. Computational Multimodality Imaging Methods for Radiotherapy Treatment Planning, Missouri River Valley AAPM Chapter Spring Meeting, May 2008, Lake of the Ozarks, MO
6. Computational Modeling Approaches in Radiation Oncology, University of Colorado Denver, November 2008, Denver, Colorado
7. Variational Methods for Image-Guided Adaptive Radiotherapy, IEEE Southwest Symposium

on Image Analysis and Interpretation, June 2010, Austin, TX

8. Machine Learning as New Tool for Predicting Radiotherapy Response in Symposium on Applications of Machine Learning in Radiotherapy, AAPM, July 2010, Philadelphia, PA
9. Application and QA of radiobiological models for radiotherapy treatment planning, King Hussein Cancer Center, October 2010, Amman, Jordan
10. Topics in Nuclear Medicine, King Hussein Cancer Center (ISEP/AAPM sponsorship), October 2010, Amman, Jordan
11. Monte Carlo Role in Radiobiological Modeling, 4th International Workshop on Recent Advances in Monte Carlo Techniques for Radiation Therapy, June 2011, Montreal, Canada
12. Interfacing Physics and Biology by Advanced Computational Modeling: Prospects and Challenges in Radiation Oncology, Carleton University, November 2011, Ottawa, ON, Canada
13. System-based approaches for radiotherapy bioinformatics and outcomes modeling, University of Toronto, January 2013, Toronto, ON, Canada
14. Monte Carlo role in radiobiological modelling of radiotherapy outcomes, Armita Institute/SACR, February 2013, Cochin, India
15. Hybrid imaging for radiotherapy, Armita Institute, February 2013, Cochin, India
16. Statistical methods for fitting of response/biological models to clinical data, ESTRO Forum, April 2013, Geneva, Switzerland
17. Statistical methods for fitting of response/biological models to clinical data, ESTRO Forum, April 2013, Geneva, Switzerland
18. Machine Learning as New Tool for Predicting Radiotherapy Response: Current Challenges and Future directions, Laboratoire d'Informatique de Paris-Nord, April 2013, Paris, France
19. Machine learning methods for radiotherapy, Maastro Clinic, April 2013, Maastricht, Netherland
20. Systems Radiobiology: At the intersection of physics and biology, Canadian Association for Physicists, May 2013, Montreal, QC, Canada
21. The Role of Big Data in Radiotherapy Outcomes Modeling: Challenges and Potentials, Laval University, January 2014, Quebec City, QC, Canada
22. The Heaven of Machine Learning in Radiotherapy: Blessing or Curse?, University of Toronto, June 2014, Toronto, ON, Canada
23. The Tripoint of Radiotherapy Outcomes: Physics, Biology & Engineering, UT Southwestern Medical Center, July 2014, Dallas, TX
24. The Tripoint of Radiotherapy Outcomes: Physics, Biology & Engineering, UT Southwestern Medical Center, July 2014, Dallas, TX
25. Radiotherapy Outcomes: A Tripoint of Physics, Biology & Engineering, University of Michigan Medical School, July 2014, Ann Arbor, MI
26. Big Data for Radiotherapy Outcomes Modeling: A Machine Learning Perspective,, University of Michigan Medical School, Ann Arbor, July 2014, Ann Arbor, MI
27. Towards Improved Biomarkers of Radiotherapy Response, Centre hospitalier de l'université de Montréal (CHUM), October 2014, Montreal, QC, Canada
28. SBRT Is it better physics or newer biology?, AQPMC, November 2014, Montreal, QC, Canada
29. SBRT Radiobiology: Is it better physics or new biology?, Southwestern Medical Center, December 2014, Dallas, TX
30. Radiomics and the Coming Pan-Omics Revolution, AAPM, July 2015, Anaheim, CA
31. Cranial TCP/NTCP Modeling Insights and Caveats, AAPM, July 2015, Anaheim, CA

32. Imaging for Outcome Assessment and Prediction (Radiomics), King Fahd Medical Center, November 2015, Riyadh, Saudi Arabia
33. Image-guidance and Adaptive Radiotherapy (IGART), King Fahd Medical Center (Sponsored by AAPM), November 2015, Riyadh, Saudi Arabia
34. Radiobiology: Past, Present and Future, King Fahd Medical Center (Sponsored by AAPM), November 2015, Riyadh, Saudi Arabia
35. Learning the pan-Omics of Radiotherapy: The Role of the Machine, COMP, July 2016, ST. JOHNS, NewFoundLand, Canada
36. Machine Learning for Oncology Analytics in the Era of Big Data, ICR/Marsden NHS, September 2016, Sutton, UK
37. Radiomics: The New Frontier in Quantitative Image Modeling, Japanese Society for Medical Physics, April 2017, Yokohama, Japan
38. Knowledge-based Monitoring and Decision-making, Michael B. Sharpe Memorial Symposium, lecturing In the session on Informatics, Computations and Algorithms, June 2017, Toronto, Canada
39. State-of-the-Art of Current PET-AS Algorithms & their Advantages & Limitations for Clinical Application, AAPM, July 2017, Denver, CO
40. Big Data Analytics in Radiation Oncology: Potentials and Challenges, Sun Nuclear: 11th QA & Dosimetry Symposium, March 2018, Orlando, FL
41. Applications of machine learning in radiation oncology, ESTRO, April 2018, Barcelona, Spain
42. Keynote: Basic principles, perspectives and applications of machine learning, big data, radiomics, in radiation oncology, Danish Society of Clinical Oncology (DSKO)., April 2018, Nyborg, Denmark
43. Big Data, Radiomics, & Machine Learning
in Medical Physics, HGPT/AAPM, September 2018, Beijing, China
44. Data Science Roundtable Presentations/AAPM's role in developing and promoting ML technology, AAPM
/Science Council, March 2019, Alexandria, VA
45. ICCR: Integrating Biology and Physics into Treatment Management
MCMA: The role of Monte Carlo in radiobiological modelling of radiotherapy outcomes, ICCR/MCMA, June 2019, Montreat, Canada
46. AI for Adaptive Radiation Therapy, AAPM, July 2019, San Antonio, TX
47. Radiobiology: application of predictive models of
tumor and normal tissue responses in therapeutic
interventions, Brazilian Congress of Medical Physics, August 2019, Santos, Brazil
48. Automatization and machine learning in radiotherapy, Brazilian Congress of Medical Physics, August 2019, Santos, Brazil
49. Machine learning algorithms in a nutshell, ASTRO, September 2019, Chicago, IL
50. Keynote: Radiomics and Radiogenomics: How to Validate and Handle Uncertainties?, Engineering and Physical Sciences in Medicine Conference and Asia-Oceania Congress of Medical Physics 2019, October 2019, Perth, Australia
51. Keynote: Top-down versus Bottom-up Radiobiological models: Which one to choose?, Engineering and Physical Sciences in Medicine Conference and Asia-Oceania Congress of Medical Physics 2019, October 2019, Perth, Australia
52. Keynote: Machine Learning in Medical Physics: Current Status and Future Potentials, Engineering and the Physical Sciences in Medicine conference, October 2019, Perth, Australia

53. Towards a Practical Implementation of Artificial Intelligence in Radiation Oncology, Royal North Shore Hospital, November 2019, Sydney, Australia
54. Towards Humane Machine Learning for Oncology Care and Discovery, Moffitt Cancer Center, February 2020, Tampa, Florida
55. Radiomics and Radiogenomics Modeling with Machine Learning, AAPM/COMP, July 2020, Vancouver, CA (Virtual)
56. Future of Quantitative Imaging Biomarkers (Radiomics) in Radiotherapy and Immunotherapy, AAPM
/COMP, July 2020, Vancouver, CA (Virtual)
57. AI in Cancer Research: Potentials and Challenges, Florida Academic Cancer Center Alliance (FACCA), October 2020, Virtual
58. Strategies of Using Radiogenomics Modeling for Lung Cancer Radiation Treatment Assessment and Prediction, ASTRO, October 2020, Virtual
59. Keynote: Artificial Intelligence in Radiation Oncology, Penn-Ohio Chapter of AAPM, October 2020, Virtual
60. Data Science in Medicine: Applications in Oncology and Medical Physics, USF Data Science for Healthcare Providers, January 2021, Online
61. Machine Learning for Radiotherapy: Opportunities and Challenges, Radiotherapy Department at Gustave Roussy, February 2021, Online Scientific Lecture
62. Future Directions in Machine Learning and their Application in Healthcare (Oncology), McGill University, McMedHacks, July 2021, Virtual
63. Automated Adaptive Decision Making with Deep Leaning Neural Network, AAPM, July 2021, Online
64. Deep Learning Strategy for Outcome Predictions in Radiation Oncology, Deep Learning Strategy for Outcome Predictions in Radiation Oncology, August 2021, Virtual
65. An introduction to Machine/Deep Learning in Medical Physics: Tips & Pitfalls, Practical Big data Workshop 2021, September 2021, Virtual
66. Machine Learning for Immuno Radiotherapy Applications, ImmunoRad 2021 Conference, September 2021, Paris, France
67. Machine Learning for Personalized Medicine: Lessons from Oncology, World Molecular Imaging Society (WMIS), October 2021, Miami, FL
68. Artificial Intelligence and Machine Learning: Potential Applications in Cancer Clinical Trials, ECOG-Acrin, October 2021, 10/2021
69. Federated Machine Learning for Oncology Applications, EDRN, NCI, October 2021, Virtual
70. Interpretability and acconability of AI and machine learning algorithms, ASTRO, October 2021, Chicago, IL
71. Adaptive Radiation Therapy with Artificial Intelligence: The Emerging Technologies and Clinical Translation, ASTRO, October 2021, Chicago, IL
72. Tackling Bias in Data Science: from Prediction to Intervention, University of Florida's Data Intelligence Symposium (DAISY), November 2021, Clear Water, FL
73. Artificial Intelligence in Radiotherapy, International Conference on Radiation Medicine (ICRM 2022), February 2022, Saudi Arabia (Virtual)
74. Automation in Radiotherapy, International Conference on Radiation Medicine (ICRM 2022), February 2022, Saudi Arabia (Virtual)
75. Moffitt Machine Learning Department Impact on Patient Care, Veterans affairs and University of South Florida, February 2022, Tampa, Florida

76. Artificial Intelligence for Multi-omics Guided Radio-immunotherapy, Accuray, February 2022, Miami, Florida
77. An Overview of Hypofractionated Treatment Effects in the Clinic (HyTEC), 13 QADS symposium, Sun Nuclear, April 2022, Orlando, FL
78. AI in Radiation Oncology, AAPM, April 2022, Palo Alto, Stanford (virtual)
79. Artificial Intelligence – An Emerging Trend in Medical Physics, 42nd Annual Conference of Association of Medical Physicists of India (AMPICON2021), May 2022, Bangalore, India
80. Imaging and molecular Biomarkers for personalized radiotherapy, New Developments in Precision Radiation Oncology & Radiogenomics, UC San Diego (UCSD) in La Jolla, June 2022, San Diego, CA
81. AI for image-guided decision support, Practical Big Data Workshop, June 2022, Ann Arbor, MI
82. Introduction to AI and multi-omics in outcome models, AAPM, July 2022, Washington, DC
83. Refresher Course: "AI across Medical Physics" Keynote: "Joint benefits and perils of AI in Medical Physics", 4th European Congress of Medical Physics (ECMP), August 2022, Dubin, IR
84. Role of radiogenomics in the individualisation of tumour response, Karolinska Institute, September 2022, Stockholm, Sweden
85. Can Artificial Intelligence Improve Risk Assessment for Radiation-induced Adverse Health Outcomes? NCRP 2023 Annual Meeting, March 2023, Bethesda, Maryland
86. Machine learning for cancer research and discovery. Mathworks EXPO (virtual), May, 2023

Seminars

1. Tools for Radiobiological Modeling, Radiobiology and Radiobiological Modeling in Radiotherapy Workshop, May 2007, Wirral, UK
2. Individualizing Tumor Control Predictions in Radiotherapy by Integrating Dosimetric Factors with Biological Markers: Prospects and Challenges in Non-Small Cell Lung Cancer, Modeling tumor response to irradiation, University of Alberta, May 2008, Edmonton, AB
3. The role of equivalent uniform dose (EUD) in radiobiological modeling, McGill University, June 2012, Montreal, QC, Canada
4. Big Data in Radiation Oncology, University of Michigan and Varian Medical Systems Strategic Partnerships Meeting, April 2015, Ann Arbor, MI
5. Robust Radiomics Modeling, Radiomics Workshop '15, October 2015, Clear Water, FL
6. Machine Learning for Oncology Analytics in the Era of Big Data, Western Ontario, August 2016, London, ON, CA
7. State-of-the-art of current PET auto-segmentation (PET-AS), AAPM, July 2017, Denver, CO
8. Radiogenomics in Radiation Oncology: More than Omics, Bright Talks (PMB), November 2017, Webinar
9. Integrating Biological and Imaging Predictors into Radiotherapy Patient Management, AAPM-Research Series Webinar, January 2018, Webinar
10. Radiomics based multi-parametric modeling: the role of data mining / machine learning, EANM (European Association of Nuclear Medicine), October 2018, Düsseldorf, Germany
11. PHYSICS PRE-MEETING COURSE- Machine Learning for Physicists, ESTRO, April 2019, Milan, Italy
12. Deep Learning for Biomedicine, 3rd International Summer School on Deep Learning, July 2019, Warsaw, Poland
13. Exporting Models and Federated Learning, Quantec 2, February 2020, Baltimore, MD

14. The Role of Imaging & Imagination in Radiotherapy, ASTRO Refresher Course, March 2020, New Orleans (Virtual)
15. Quick Guides to SePng Up Algorithms (LASSO, GLM, RF, XGBoost and more), 2021 Practical Big Data Workshop, September 2021, Virtual
16. What is the "intelligence" of Artificial Intelligence in radiation therapy?, AAPM Webinars, November 2021, Virtual
17. Basic principles and the future of mathematical modeling in clinical radiobiology, Turkish Society for Radiation Oncology (TROD), February 2022, Virtual
18. Radiomics: How to Validate and Handle Uncertainties?, Turkish Society for Radiation Oncology (TROD), March 2022, Virtual
19. Normal tissue tolerance in radiobiology: volume effect, FSU, NTCP, DVH concepts, Turkish Society for Radiation Oncology (TROD), March 2022, Virtual
20. Radiation Biology of High Dose per Fraction, AAPM Summer school, June 2022, Dallas, TX
21. Intelligent Sensors for Real-time Guidance during Radiotherapy (including Flash), Dartmouth, 08/11/2022
22. Intelligent Sensors for Real-time Guidance during Radiotherapy, Garching, 10/10/2022
23. AI Modeling for Personalized Radiotherapy Outcomes, Klinikum, 11/10/2022
24. Quantum machine learning: Lessons learnt from Application in Medical Physics and Radiation Oncology, Munich Center for Quantum Science and Technology, 17/10/2022
25. What is AI and how it is transforming Medical Physics?, Medical Physics students lecture, 18/10/2022
26. Perils and Pitfalls of AI in Radiological Sciences, CAS, 20/10/2022
27. Can Physics Principles Aid Advancing Artificial Intelligence Application in Radiotherapy? Massachusetts General Hospital, Radiation Oncology, Physics Seminar (Virtual), 11/01/2022
28. New deep learning methods for interrogating immunotherapy response, 4th Orien annual meeting, Salt Lake City, 03/2023, 2023
29. A novel graphical deep neural network learning approach utilizing molecular data for optimizing patient selection for treatment with immune checkpoint inhibitors: An ORIEN pan-cancer study, 4th Orien annual meeting, Salt Lake City, 03/2023, 2023

Patents

Application in Process

11, 141, 086: Silicon Photomultiplier Array-Based Multispectral Optical Probes For Image- Guided Radiotherapy, Inventor, Submitted on 05/2017

Quantum CDSS In Radiation Oncology, Inventor, Submitted on 12/2015

Disclosure

10/2014 James Coates and Issam El Naqa, 05001770-509USPR, Inventor, Submitted on

10/2013 10/2022 ARCliDS (Adaptive Radiotherapy Clinical Decision Support), 10110-321PV1, Inventor, Submitted on 10/2022

A software tool that correlates physical data from smart wearable sensors to predict clinical outcomes in patients, 20MB058PR, Co-inventor, Submitted on

05/2021 ADAPTIVE RADIOTHERAPY CLINICAL DECISION SUPPORT TOOL AND RELATED METHODS, MCC Ref. No. 10110-321PV1, Co-inventor, Submitted on 10/2021

Combined Radiation Acoustics and Ultrasound for Radiotherapy Guidance and

Cancer Targeting, UM Ref: 2018-310, Inventor, Submitted on 02/2018

Machine learning-based methods and systems for predicting risk based on multi-modal health data (w/ Gonzales)., MCC Ref. No.: 10110-296PV1, Inventor, Submitted on 05/2021

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Peer-Reviewed Journals and Publications

1. **El Naqa I.**, Mismar J., and Zabalawi I.: Estimation of Coronary Artery Dimensions by Median Filtering Approach EICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences E97-A(7): 1034-1043, 1996.
2. **El-Naqa I**, Yang Y, Wernick MN, Galatsanos NP, Nishikawa RM: A support vector machine approach for detection of microcalcifications IEEE Trans Med Imaging 21(12): 1552-1563, 2002. PM12588039
3. Bradley J, Deasy JO, Bentzen S, **El-Naqa I**: Dosimetric correlates for acute esophagitis in patients treated with radiotherapy for lung carcinoma Int. J. Radiat. Oncol. Biol. Phys. 58(4): 1106-1113, 2004. PM15001251/15001251
4. **El-Naqa I**, Yang Y, Galatsanos NP, Nishikawa RM, Wernick MN: A similarity learning approach to content- based image retrieval: Application to digital mammography IEEE Trans Med Imaging 23(10): 1233-1244, 2004. PM15493691
5. Mansur DB, **El Naqa I**, Kong F, Klein EE, Taylor ME, Zoberi I, Bradley JD, Perez CA: Localization of internal mammary lymph nodes by CT simulation: Implications for breast radiation therapy planning Radiother Oncol 73(3): 355-357, 2004. PM15588882
6. Lu W, Parikh PJ, **El Naqa IM**, Nystrom MM, Hubenschmidt JP, Wahab SH, Mutic S, Singh AK, Christensen GE, Bradley JD, Low DA: Quantitation of the reconstruction quality of a four-dimensional computed tomography process for lung cancer patients Med Phys 32(4): 890-901, 2005. PM15895571
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8. Megri A., **El Naqa I.**, Haghighat F.: A Learning Machine Approach For Predicting Thermal Comfort Indices
   International Journal of Ventilation 3(4): 363-376, 2005.
9. **El Naqa I**, Kawrakow I, Fippel M, Siebers JV, Lindsay PE, Wickerhauser MV, Vicic M, Zakarian K, Kauffmann N, Deasy JO: A comparison of Monte Carlo dose calculation denoising techniques Phys Med Biol 50(5): 909-922, 2005. PM15798264
10. Blanco AI, Chao KS, **El Naqa I**, Franklin GE, Zakarian K, Vicic M, Deasy JO: Dose-volume modeling of salivary function in patients with head-and-neck cancer receiving radiotherapy Int. J. Radiat. Oncol. Biol. Phys. 62(4): 1055-1069, 2005. PM15990009
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12. Zheng J, **El Naqa I**, Rowold FE, Pilgram TK, Woodard PK, Saffitz JE, Tang D: Quantitative assessment of coronary artery plaque vulnerability by high-resolution magnetic resonance imaging and computational biomechanics: A pilot study ex vivo Magn Reson Med 54(6): 1360-1368, 2005. PM16265643
13. **El Naqa I**, Low DA, Bradley JD, Vicic M, Deasy JO: Deblurring of breathing motion artifacts in thoracic PET images by deconvolution methods Med Phys 33(10): 3587-3600, 2006. PM17089825
14. Megri A., Megri F., **El Naqa I.**, Achard G.:

A new tool for the prediction and the analyses of thermal comfort in variable steady operation
Annals of the building and public works (in French), 1(February-April): 2-50, 2006.

15. **El Naqa I**, Bradley J, Blanco AI, Lindsay PE, Vicic M, Hope A, Deasy JO: Multivariable modeling of radiotherapy outcomes, including dose-volume and clinical factors Int. J. Radiat. Oncol. Biol. Phys. 64(4): 1275-1286, 2006. PM16504765

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