Chong Duan, PhD

Boston, MA
+1 (314) 691-7072
chongduan.github.io
duanchong520@gmail.com

Experience

Pfizer – Cambridge, MA

Director,	**Digital Sciences & Translational Imaging**	**Apr 2023 – Present**
Associate Director,	**Digital Sciences & Translational Imaging**	**Jul 2021 – Apr 2023**
Manager,	**Digital Sciences & Translational Imaging**	**Jul 2019 – Jun 2021**

1. Lead the development, validation, and deployment of novel AI solutions for high dimensional and unstructured data (biomedical imaging, histopathology, medical photography, and multiomics) in drug R&D to enable decision making
2. Lead research collaboration/consortium with academics, AI companies, and non-for-profit (e.g., FNIH) for AI initiatives (up to $2M funding support)
3. Developed a deep learning-based, fully automated, end-to-end echocardiogram analysis pipeline for evaluating cardiac structure and function (Pearson's r > 0.92 when compared to ground truth); Won the Pfizer Breakthrough Science & Innovation Award in 2021 - *Paper*, *AWS Blog*
4. Built machine learning-based predictive models for liver steatosis and fibrosis using vital signs, serum biomarkers, and clinical imaging measures for NAFLD/NASH and obesity/diabetes programs (>7% improvement on AUROC score)
5. Established a multimodal (clinical imaging + digital pathology + genomics/transcriptomics) analysis platform for Pfizer's immuno-oncology portfolio
6. Preclinical and clinical imaging data management: acquisition, curation, storage, and sharing

Invicro, A Konica Minolta Company – Boston, MA

Imaging Scientist, Discovery Research	**Feb 2019 – Jul 2019**

1. Led the design and execution of translational imaging studies (e.g., MRI/PET/SPECT) to support drug development programs (e.g., perfusion, oxygenation, bio-distribution, PK/PD, toxicology) for pharma/healthcare/life science companies and academic institutions

Harvard University – Boston, MA

Postdoctoral Research Fellow, Cardiovascular Imaging	**Sep 2017 – Jan 2019**

1. Built a deep learning-based image reconstruction pipeline for substantially under-sampled MRI data (>4x acceleration in scan time)
2. Developed a contrast agent-free MRI method for detecting myocardial infarction (>50% increase of contrast-to-noise ratio) - *GitHub* & *Paper*

Schlumberger – Cambridge, MA

Research Intern, Sensor Physics	**May 2016 – Oct 2016**

1. Built a simulation tool for virtual oil-well logging apparatus prototyping - *Paper*

Washington University in St. Louis – St. Louis, MO

Graduate Research Assistant	**Aug 2014 – Aug 2017**

1. Built a Bayesian model selection method with Markov chain Monte Carlo simulation for comparing the performance (accuracy vs. precision in parameter estimation) of commonly employed dynamic contrast-enhanced (DCE) MRI models - *Paper*

2. Developed a constrained local arterial input function (cL-AIF) method for the pharmacokinetic modeling of cervical cancer DCE-MRI data, which outperforms the standard global AIF method in >80% of the tumor voxels - *Paper*

Education

PhD in Physical Chemistry (Magnetic Resonance Imaging)
Washington University in St. Louis – St. Louis, MO   2017

MS in Computer Science (specialization in Machine Learning)
Georgia Institute of Technology – Atlanta, GA   2021

BS in Chemistry
Nankai University – Tianjin, China   2012

Skills

- Python, R, MATLAB, C++, Fortran
- TensorFlow, PyTorch, Keras/PyTorch Lightning, scikit-learn, OpenCV, scikit-image, Pyradiomics
- Regression / Classification / Clustering / Dimensionality Reduction
- CNN, RNN, Transformer, ViT, VAE, GANs, traditional ML models (SVM, XGBoost, KNN, etc.)
- Docker, Jupyter Notebook, Git / GitHub, AWS

Leadership and Awards

Breakthrough Science & Innovation Award (Pfizer) *(Highest honor for Pfizer Worldwide R&D colleagues, $25K cash prize)*	2021
William E. Upjohn Prizes Award (Pfizer)	2020
Journal of Cardiovascular Magnetic Resonance (JCMR) Gold Star Reviewer Award	2019 & 2020
Dean's Dissertation Fellowship (Washington University in St. Louis)	2017
The ISMRM Summa Cum Laude Merit Award *(Top 3% oral presentations)*	2016 & 2017
Teaching Assistant Award (Washington University in St. Louis)	2014
Chemical Safety Contest winner (Washington University in St. Louis)	2012
First Prize of Excellence Scholarship (Nankai University)	2009 – 2011

Certificates

IDEA Sequence Programing (MRI), by **Siemens**	2018
Certificate in Applied Biostatistics, by **Harvard Catalyst**	2018-2019

Selected services

Project team member, Biomarkers Consortium: Mucosal Healing in Ulcerative Colitis, FNIH

Reviewer, JCMR, MRM, NMR in Biomedicine, MIB, and JNO

Invited Talks & Oral Presentations

1. Joint Statistical Meeting (JSM) 2022, "Deep Learning for Image Analysis - Initial Development of Digital Diagnostic/Prognostic Algorithms: Analogies and Lessons Learned from Drug Development", Washington, DC, August 2022 **[Invited Session Speaker]**

2. AWS Healthcare & Life Sciences Symposium 2022, "Developing and Deploying Deep Learning-based Echocardiography Analysis with AWS", March 2022

3. 77th AALAS National Meeting, "Fully Automated Mouse Echocardiography Analysis with Deep Convolutional Neural Networks", October 2021

4. Summit for Clinical Ops Executives (SCOPE) 2021 – "Clinical Image Management and Exploration at Pfizer", June 2020

5. 22nd annual meeting of the Society for Cardiovascular Magnetic Resonance, "Non-contrast Myocardial Viability Assessment Using a Hybrid Native T1 and Magnetization Transfer Imaging Sequence", Bellevue, Washington, June 2019

6. 27th annual meeting of the International Society of Magnetic Resonance in Medicine, "CMR in Kidney Failure: Non-Contrast Imaging", Montreal, Québec, Canada, 2019 **[Invited Session Moderator]**

7. 22nd annual meeting of the Society for Cardiovascular Magnetic Resonance, "Focus Session 6: MR Techniques and Methods: Non-contrast CMR and New Contrast Mechanisms", Bellevue, Washington, 2019 **[Invited Session Moderator]**

8. 25th annual meeting of the International Society of Magnetic Resonance in Medicine, "Irradiated Brain Parenchyma Promotes Virulent Proliferation of Naive Glioma Cells: Mouse Model of Recurrent Glioblastoma", Honolulu, Hawaii, May 2017

9. 24th annual meeting of the International Society of Magnetic Resonance in Medicine, "Can anti-VEGF Antibody Reverse Radiation Necrosis? A Preclinical Investigation", Singapore, May 2016

Publications

1. **Duan C**, Montgomery MK, Chen X, Ullas S, Stansfield J, McElhanon K and Hirenallur-Shanthappa D, 2022. "Fully automated mouse echocardiography analysis using deep convolutional neural networks," *American Journal of Physiology-Heart and Circulatory Physiology*, 323(4), pp.H628-H639.

2. Chen C, Yang X, Dou H, Huang R, Huang X, Wang X, **Duan C**, et al. "Bridge Segmentation Performance Gap Via Evolving Shape Prior," *IEEE Access (2020)*, vol. 8, pp. 173961-173973

3. Zhu Y, Fahmy AS., **Duan C**, Nakamori S, Nezafat R. Automated Myocardial T2 and Extracellular Volume Quantification in Cardiac MRI Using Transfer Learning–based Myocardium Segmentation. *Radiology: Artificial Intelligence (2020)*, 2(1), e190034

4. Neisius U, Myerson L, Fahmy A, Nakamori S, El-Rewaidy H, Joshi G, **Duan C**, et al. "Cardiovascular magnetic resonance feature tracking strain analysis for discrimination between hypertensive heart disease and hypertrophic cardiomyopathy." *PloS one* (2019) 14, no. 8.

5. **Duan C**, Yang R, Yuan L, et al. Late effects of radiation prime the brain microenvironment for accelerated tumor growth. *Int J Radiat Oncol Biol Phys* 103.1 (2019): 190-194.

6. Zhu Y, Kang J, **Duan C**, et al. Integrated motion correction and dictionary learning for free-breathing myocardial T_1 mapping. *Magn Reson Med.* (2019):81:2644–2654.

7. **Duan C**, Zhu Y, Jang J, et al. Non-Contrast Assessment of Myocardial Viability using a Hybrid Native T1 and Magnetization Transfer Imaging Sequence. *Magn Reson Med.* (2018) https://doi.org/10.1002/mrm.27636

8. **Duan C**, Kallehauge JF, Pérez-Torres CJ, et al. Modeling Dynamic Contrast-Enhanced MRI data with a Constrained Local AIF. *Mol Imaging Biol* (2018) 20: 150. https://doi.org/10.1007/s11307-017-1090-x

9. Yang R*, **Duan C***, Yuan L, et al. Inhibitors of HIF-1α and CXCR4 Mitigate the Development of Radiation Necrosis in Mouse Brain. *Int J Radiat Oncol Biol Phys* (2018) 100 (4): 1016-1025. **[*Co-First Authorship]**

10. **Duan C**, Kallehauge JF, Bretthorst GL, et al. Are Complex DCE-MRI Models Supported by Clinical Data? *Magn Reson Med* (2017) 77:1329-1339.

11. **Duan C,** Ryan C, Utsuzawa S, et al. Effect of Off-Resonance on T_1 Saturation Recovery Measurement in Inhomogeneous Field. *J Magn Reson* (2017) 281: 31-43.

12. **Duan C**, MRI in Cancer: Improving Methodology for Measuring Vascular Properties and Assessing Radiation Treatment Effects in Brain. *Arts & Sciences Electronic Theses and Dissertations (2017).* 1237. https://openscholarship.wustl.edu/art_sci_etds/1237

13. **Duan C,** Pérez-Torres CJ, Yuan L, et al. Can anti-Vascular Endothelial Growth Factor Antibody Reverse Radiation Necrosis? A Preclinical Investigation (**Cover Article**). *J Neurooncol* (2017) 133: 9-16.

14. Leuthardt EC*, **Duan C***, Kim MJ, et al. Hyperthermic Laser Ablation of Recurrent Glioblastoma Leads to Temporary Disruption of the Peritumoral Blood Brain Barrier. *PLoS ONE* (2016) 11(2): e0148613. doi:10.1371 **[*Co-First Authorship]**

15. Meinerz K, Beeman S, **Duan C**, et al. Bayesian Modeling of NMR Data: Quantifying Longitudinal Relaxation in Vivo and in Vitro with a Tissue-Water-Relaxation Mimic (Crosslinked Bovine Serum Albumin) *Appl Magn Reson* (2018) 49: 3-24.

16. Beeman S, Osei-Owusu P, **Duan C**, et al. Renal DCE-MRI Model Selection Using Bayesian Probability Theory. *Tomography* (2015) 1:61–68.

17. Kallehauge J, Tanderup K, **Duan C**, et al. Tracer Kinetic Model Selection for Dynamic Contrast Enhanced MRI of Locally Advanced Cervical Cancer. *Acta Oncologia* (2014) 53: 1064-1072.

18. Zhou R, **Duan C,** Yang C, et al. Phosphane-Catalyzed [4+1] Annulation between Nitroalkenes and Morita-Baylis-Hillman Carbonates: Facile Synthesis of Isoxazoline N-oxides by Phosphorus Ylides. *Chem Asian J* (2014) 9(4): p.1183-9.

19. Zhou R, Wang J, **Duan C**, et al. Phosphine-Triggered Tandem Annulation between Mortita-Baylis-Hillman Carbonates and Dinucleophiles: Facile Syntheses of Oxazapanes, Thiazapanes, and Diazepanes. *Organic letters* (2012) 14 (24): 6134-6137.