# Daniel J. Blezek, Ph.D.

ASSISTANT PROFESSOR OF BIOMEDICAL ENGINEERING · ASSOCIATE CONSULTANT

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## Education

**Mayo Graduate School of Biomedical Sciences**                                    *Rochester, MN*

PH.D. IN BIOMEDICAL ENGINEERING                                                      *1999*

**University of Minnesota**                                                          *Duluth, MN*

B.S. IN COMPUTER ENGINEERING                                                         *1994*

## Research

**Department of Radiology**                                             *Mayo Clinic, Rochester, MN*

ASSOCIATE CONSULTANT MEDICAL PHYSICS                                                 *2019 - PRESENT*

- Leading efforts to translate AI algorithms into clinical practice
- Oversight of Enterprise Radiology's AI projects
- Managing multiple concurrent AI efforts
- Delivering algorithms for
    - kidney volume quantification
    - brain tumor biomarker identification
    - denoising of low-dose CT
    - lung pathology CAD
    - pancreatic cancer detection
    - tractography guidance of MR guided focused ultrasound in the brain
- Foster collaboration between radiologists, clinicians, researchers and IT

**Division of Neruoradiology**                                          *Mayo Clinic, Rochester, MN*

ADVANCED IMAGING SCIENTIST                                                           *2016 - 2019*

- Responsible for translation of research into clinical practice in partnership with radiologists, clinicians and scientists
- Built reusable framework for deployment of Machine Learning algorithms into PACS workflow
- Engineered Machine Learning framework for image segmentation and classification
- Created individualized visualization of patient record aiding interpretation of glioma studies
- Constructed and deployed automated tractography algorithm
- Extended 3d printing capabilities of the Anatomic Modeling Lab into neuro-imaging
- Partnered with radiologists and clinicians to identify translation research
- Mentored postdoctoral fellows and Biomedical Engineering graduate students

**Advanced Analytics**                                                  *Mayo Clinic, Rochester, MN*

TECHNICAL LEAD                                                                       *2015 - 2016*

- Lead technical development of the Data Discovery Platform
- Managed development team of engineers and embedded support programmers
- Interfaced with cross-functional teams
- Facilitated Machine Learning Journal Club

**FlowSigma, Inc.**                                                                 *Rochester, MN*

CTO                                                                                 *2016 - PRESENT*

- Engineered advanced orchestration engine for radiology departments
- Co-founded startup to commercialize Mayo Clinic IP
- Consult with research teams to validate and translate projects into clinical practice

**Medical Imaging Informatics Innovation Center**　　　　　　　*Mayo Clinic, Rochester, MN*

TECHNICAL LEAD　　　　　　　　　　　　　　　　　　　　　　*2007 - 2016*

- Director of technical research and development
- Support clinical research for Quantitative Imaging Network
- Led development projects for enterprise-class imaging workflow application
- Developed high performance software for multi-cores, GPUs, and cluster
- Managed a development and support team
- Mentored post-doctoral fellows and graduate students

**Visualization and Computer Vision**　　　　　　　*GE Global Research, Niskayuna, NY*

SENIOR COMPUTER SCIENTIST　　　　　　　　　　　　　　　　*1999 - 2007*

- Developemented algorithms and systems to process and analyze MR images
- MRI parameter estimation, quantitation and artifact correction
- Pre-clinical imaging experimental design, development, execution and image analysis
- Address imaging challenges by combining systems modeling, imaging physics and image analysis
- Applied biomedical image analysis software to clinical research
- Automated segmentation and model based evaluation of MR, SPECT, and CT images
- Distributed and multiprocessing approaches to large computing problems

# Skills

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|---|---|
| **Medical Image Analysis** | • Expert in the field of multimodality medical image processing and analysis<br>• Cognizant of current developments in segmentation, registration, analysis, and modeling<br>• Understand pertinent aspects of MRI physics, pulse sequences and image formation<br>• Substantial experience in clinical and industrial research settings |
| **Machine Learning** | • Comprehensive understanding of data science, data engineering and machine learning<br>• Expert in TensorFlow machine learning library<br>• Architected machine learning systems for organ/tumor segmentation, and genomic classification from images |
| **Software Engineering** | • Extensive experience in software development in clinical and industrial settings<br>• Headed diverse development teams, local and distributed, research-oriented, open source and commercial<br>• Collaborated with researchers, clinicians, developers and administrators |
| **Technologies** | C++, Java, Kotlin, Go, Python, SQL, DICOM, Matlab, Linux, iOS, TensorFlow, VTK, ITK, Javascript, AWS/GCP/Azure |

# Selected Publications

D. J. Blezek and J. V. Miller, "Atlas stratification," *Medical Image Analysis*, vol. 11, no. 5, pp. 443–457, 2007.

I. Hancu, D. J. Blezek, and M. C. Dumoulin, "Automatic repositioning of single voxels in longitudinal 1H MRS studies," *NMR in Biomedicine*, vol. 18, no. 6, pp. 352–361, 2005.

R. Peter, P. Korfiatis, D. Blezek, A. Oscar Beitia, I. Štepán Buksakowska, D. Horinek, K. D. Flemming, and B. J. Erickson, "A quantitative symmetry-based analysis of hyperacute ischemic stroke lesions in noncontrast computed tomography.," *Medical Physics*, vol. 44, pp. 192–199, Jan. 2017.

T. Kapur, S. Pieper, A. Fedorov, J.-C. Fillion-Robin, M. Halle, L. O'Donnell, A. Lasso, T. Ungi, C. Pinter, J. Finet, S. Pujol, J. Jagadeesan, J. Tokuda, I. Norton, R. S. J. Estepar, D. Gering, H. J. W. L. Aerts, M. Jakab, N. Hata, L. Ibanez, D. Blezek, J. Miller, S. Aylward, W. E. L. Grimson, G. Fichtinger, W. M. Wells, W. E. Lorensen, W. Schroeder, and R. Kikinis, "Increasing the impact of medical image computing using community-based open-access hackathons: The NA-MIC and 3D Slicer experience.," *Medical Image Analysis*, vol. 33, pp. 176–180, Oct. 2016.

B. J. Erickson, S. G. Langer, D. J. Blezek, W. J. Ryan, and T. L. French, "DEWEY: the DICOM-enabled workflow engine system.," *Journal of Digital Imaging*, vol. 27, pp. 309–313, June 2014.

I. L. Štepán Buksakowska, J. M. Accurso, F. E. Diehn, J. Huston, T. J. Kaufmann, P. H. Luetmer, C. P. Wood, X. Yang, D. J. Blezek, R. Carter, C. Hagen, D. Hořínek, A. Hejčl, M. Roček, and B. J. Erickson, "Computer-aided diagnosis improves detection of small intracranial aneurysms on MRA in a clinical setting.," *AJNR*, vol. 35, pp. 1897–1902, Oct. 2014.

S. G. Langer, K. Persons, B. J. Erickson, and D. Blezek, "Towards a more cloud-friendly medical imaging applications architecture: a modest proposal.," *Journal of Digital Imaging*, vol. 26, pp. 58–64, Feb. 2013.

W. T. Dixon, D. J. Blezek, L. A. Lowery, D. E. Meyer, A. M. Kulkarni, B. C. Bales, D. L. Petko, and T. K. Foo, "Estimating amounts of iron oxide from gradient echo images," *Magnetic Resonance in Medicine*, vol. 61, no. 5, pp. 1132–1136, 2009.

C. J. Hardy, R. O. Giaquinto, J. E. Piel, R. K. W, L. Marinelli, D. J. Blezek, E. W. Fiveland, R. D. Darrow, and T. K. Foo, "128-channel body mri with a flexible high-density receiver-coil array," *JMRI*, vol. 28, no. 5, pp. 1219–1225, 2008.

C. R. Jack *et al.*, "The Alzheimer's Disease Neuroimaging Initiative (ADNI): MRI methods.," *JMRI*, vol. 27, pp. 685–691, Apr. 2008.

B. C. Lowekamp, D. T. Chen, L. Ibáñez, and D. Blezek, "The design of SimpleITK.," *Frontiers in neuroinformatics*, vol. 7, p. 45, 2013.

E.-M. Ratai, I. Hancu, D. J. Blezek, K. W. Turk, E. Halpern, and R. G. González, "Automatic repositioning of MRSI voxels in longitudinal studies: impact on reproducibility of metabolite concentration measurements.," *JMRI*, vol. 27, pp. 1188–1193, May 2008.

J. G. Fletcher, L. Yu, Z. Li, A. Manduca, D. J. Blezek, D. M. Hough, S. K. Venkatesh, G. C. Brickner, J. C. Cernigliaro, A. K. Hara, *et al.*, "Observer performance in the detection and classification of malignant hepatic nodules and masses with ct image-space denoising and iterative reconstruction," *Radiology*, vol. 276, no. 2, pp. 465–478, 2015.

E. C. Ehman, L. Yu, A. Manduca, A. K. Hara, M. M. Shiung, D. Jondal, D. S. Lake, R. G. Paden, D. J. Blezek, M. R. Bruesewitz, *et al.*, "Methods for clinical evaluation of noise reduction techniques in abdominopelvic CT," *Radiographics*, vol. 34, no. 4, pp. 849–862, 2014.

P. D. Korfiatis, T. L. Kline, D. J. Blezek, S. G. Langer, W. J. Ryan, and B. J. Erickson, "Mirmaid: A content management system for medical image analysis research.," *Radiographics*, vol. 35, pp. 1461–1468, 2015.

Z. Li, L. Yu, J. D. Trzasko, D. S. Lake, D. J. Blezek, J. G. Fletcher, C. H. McCollough, and A. Manduca, "Adaptive nonlocal means filtering based on local noise level for CT denoising," *Medical Physics*, vol. 41, no. 1, 2014.

X. Yang, D. J. Blezek, L. T. Cheng, W. J. Ryan, D. F. Kallmes, and B. J. Erickson, "Computer-aided detection of intracranial aneurysms in MR angiography," *Journal of Digital Imaging*, vol. 24, no. 1, pp. 86–95, 2011.