BIOGRAPHICAL SKETCH

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NAME: Franz Edward Boas, MD, PhD

eRA COMMONS USER NAME (credential, e.g., agency login): boasfe

POSITION TITLE: Assistant Attending Radiologist

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Harvard University, Cambridge, MA	AB	06/1999	Biochemistry
Stanford University, Stanford CA	MD	06/2008	Medicine
Stanford University, Stanford CA	PhD	06/2008	Biochemistry
Stanford Hospital, Stanford CA		06/2009	Internship, General surgery
Stanford Hospital, Stanford CA		06/2013	Residency, Radiology
University of Pennsylvania, Philadelphia, PA		06/2014	Fellowship, Interventional Radiology

A. Personal Statement

My long-term goal is to develop new methods for improving tumor embolization and ablation, test them in animals, and then translate the most promising methods into human clinical trials. The basic strategy is to make tumor embolization safer and more effective by using new intra-arterial agents and devices, and to develop methods for safely embolizing tumors outside the liver. We have a grant from the DOD to develop a pig HCC model, and a grant from the Thompson family foundation to develop new locoregional therapies for pancreatic cancer. Other projects include: TACE using extended release lipiodol emulsions, embolization of liver tumors using vaccine adjuvants, embolization using a drug-eluting glue, and adjuvant medications for locoregional therapy.

Our team is uniquely qualified to perform this research project. Our collaborators at the University of Illinois have developed the Oncopig, a transgenic pig that develops site-specific tumors, induced by local injection of an adenoviral vector. We have successfully induced liver and pancreatic tumors in the Oncopig. This will allow us to try various experimental embolization and ablation techniques that could not be tested in humans. Pigs have similar vascular anatomy and size compared to humans, and embolization and ablation are performed using the same catheters and devices used in humans. This should enable easier translation to human clinical trials. At MSKCC, we have IACUC approval, a dedicated IR animal lab, and a large patient population that is interested in enrolling in clinical trials.

I have performed hundreds of embolization and ablation procedures on both humans and pigs, and have developed new methods for imaging liver tumors, and predicting response to embolization. I have published 38 papers and 48 abstracts that have been cited a total of 1736 times.

I have a track record for developing new tools for diagnostic and interventional radiology, and bringing them into routine clinical use. For example, I developed a patented method (MDT) for reducing metal artifacts in CT scans,

which improves image quality in 86% of scans, and improves diagnosis in 14% of scans. This method has been successfully used in 160 hospitals, including MGH, MD Anderson, and Stanford.

I joined the interventional radiology service at MSKCC in July 2014, after finishing an interventional radiology fellowship at University of Pennsylvania, and a radiology residency at Stanford. I currently spend about 70% of my time on clinical duties and 30% on research. My clinical focus is on tumor embolization and ablation.

B. Positions and Honors

Positions

July 2014 – present	Assistant Attending, Interventional Radiology Service, Department of Radiology, Memorial Sloan Kettering Cancer Center, New York, NY
Oct. 2014 – present	Assistant professor of radiology, Weill Cornell Medical College, Cornell University, New York, NY

Selected honors

2013	RSNA Roentgen Resident/Fellow Research Award
2013	ARRS Residents in Radiology Executive Council Award
1998	Barry M. Goldwater Scholar
1996, 1997	John Harvard Scholar

Other professional activities

2018 – 2019	SIR grant review committee
2018	Reviewer for *Nature Communications*
2014 – 2018	Reviewer for *JVIR*
2015	Reviewer for *CVIR*
2015	Reviewer for WCIO
2015	Reviewer for *Academic Radiology*
2013	Reviewer for *AJNR*, *Medical Physics*, and *Neuroradiology*
1998 – 1999	President, Harvard Science Review
1998 – 1999	President, Harvard Hippocratic Society

C. Contribution to science (with selected publications)

1. **Pig tumor models**. Developed pig models for liver and pancreatic cancer, which will allow testing of new embolization and ablation techniques.
    a. **Boas FE**, Gonzalez Aguirre A, Srimathveeravalli G, Rund L, Schwind R, Schook L, Erinjeri J, Solomon S, Yarmohammadi H. (2017) “Induction of pancreatic cancer in a porcine model: Initial results.” *Journal of Vascular and Interventional Radiology* 28(2): S181.
    b. Yarmohammadi H, Gonzalez-Aguirre AJ, Schook L, Ziv E, Erinjeri JP, Brown KT, Srimathveeravalli G, O’Reilly EM, Allen PJ, Solomon SB, **Boas FE**. (2017) “Treatment of pancreatic cancer by intra-arterial injection of an emulsion of Lipiodol and Bumetanide (an anti-glycolytic drug) in a porcine model: Initial results.” *Journal of Vascular and Interventional Radiology* 28(2): S8-9.

2. **Locoregional therapy of liver tumors**. Developed several new tools and techniques for improving embolization and ablation of liver tumors.
    a. **Boas FE**, Brown KT, Ziv E, Yarmohammadi H, Erinjeri JP, Sofocleous CT, Harding JJ, Solomon SB. (2017) “Aspirin is associated with lower bilirubin after embolization of hepatocellular carcinoma.” Oral presentation at SIR 2018. Submitted to *JVIR*.
    b. **Boas FE**, Ziv E, Yarmohammadi H, Brown KT, Erinjeri JP, Sofocleous CT, Harding JJ, Solomon SB. (2017) “Adjuvant medications that improve survival after locoregional therapy.” *Journal of Vascular and Interventional Radiology*. 28: 971-7.

c. **Boas FE**, Srimathveeravalli G, Kaye EA, Durack JC, Erinjeri JP, Ziv E, Maybody M, Yarmohammadi H, Solomon SB. (2017) "Development of a searchable database of cryoablation simulations, for use in treatment planning." *Cardiovascular and Interventional Radiology*. 40(5): 761-8.
d. **Boas FE**, Brody LA, Erinjeri JP, Yarmohammadi H, Shady W, Kishore S, Sofocleous CT. (2015) "Quantitative enhancement measurements on pre-procedure triphasic CT can predict response to radioembolization of colorectal liver metastases." *AJR*. 207: 671-5.
e. **Boas FE**, Do B, Louie JD, Kothary N, Hwang GL, Kuo WT, Hovsepian DM, Kantrowitz M, Sze DY. (2015) "Optimal imaging surveillance schedules after liver-directed therapy for hepatocellular carcinoma." *Journal of Vascular and Interventional Radiology*. 26(1): 69-73.

3. **Custom binding proteins**. Developed and validated a technique for predicting binding constants, predicting structures of protein binding sites, and designing binding proteins. This was the first successful design of a binding protein using a standard physical model, which could pave the way for the rational design of new biotech drugs.
    a. **Boas FE**, Harbury PB. (2008) "Design of protein-ligand binding based on the molecular-mechanics energy model." *J Mol Biol*. 380(2):415-24.

4. **Red blood cell aging**. Identified a chemical signal used to recognize and remove old red blood cells from the circulation.
    a. **Boas FE,** Forman L, Beutler E. (1998) "Phosphatidylserine exposure and red cell viability in red cell aging and in hemolytic anemia." *Proc Natl Acad Sci U S A*. 95(6):3077-81.

5. **Research web PACS**. Co-developed a multi-institutional research web PACS with image analysis and image processing plug-ins, interactive multimedia radiology reports, and screen share. This PACS currently contains more than 120,000 anonymized and annotated images that are available for research use, thus enabling multi-site research collaboration.
    a. http://www.claripacs.com

6. **CT metal artifact reduction**. Developed a patented method (MDT) for reducing metal artifacts in CT scans, which improves image quality in 86% of scans, and improves diagnosis in 14% of scans. This includes cases of cancer and stroke that were missed without MDT. MDT has been successfully used on hundreds of patients in 160 hospitals, including MGH, MD Anderson, and Stanford. This project involved development of a scalable cloud application, integration with PACS, and technology licensing.
    a. **Boas FE** and Fleischmann D. (2011) "Evaluation of two iterative techniques for reducing metal artifacts in computed tomography." *Radiology*. 259(3): 894-902.
    b. **Boas FE**. (2012) "Iterative reduction of artifacts in computed tomography images using forward projection and an edge-preserving blur filter." U.S. Patent 8233586.
    c. http://www.revisionrads.com

D. Research Support

Current support:

W81XWH-16-1-0338 (PI: Boas) 8/1/2016 - 7/31/2019
Department of Defense, Congressionally Directed Medical Research Programs
Genetically Inducible Porcine Model of Primary and Metastatic HCC in Comorbidity Host Environments for Interventional Radiology Guided Detection and Treatment
The goal of our study is to close gaps between early detection, diagnosis, screening, and treatment of liver cancer and to provide a reliable model to study tumor growth and treatment of tumors.
Role: Principal Investigator

Thompson family foundation. 2017-2022
Targeting pancreatic cancer
Role: Aim co-leader

Society of Interventional Oncology 2019 –2020
Transarterial lipiodol chemoembolization research grant.
Phase I study of transarterial chemoembolization of lung metastases
Role: Principal Investigator

Completed support:

None