



Frezghi Habte

Director, Stanford Center for Innovations in In vivo Imaging (SCi3), Stanford Center for Innovation and In Vivo Imaging

Bio

BIO

Dr. Habte, originally from Eritrea, got his MSc and Ph.D. from Stockholm University, Sweden, in applied Physics. Prior to his recruitment in 2008 as an imaging scientist at Stanford University, Dr. Habte has worked on various research centered on imaging system development, including new radiation detector design, readout electronics, Monte Carlo simulations and computations tools. In his current position, as director of a small animal imaging facility at Stanford, Dr. Habte run and oversee the operations and services of the imaging facility. His work requires close collaboration with researchers and investigators to help solve any issues related to the in vivo imaging and quantitation of images acquired with different modalities including PET/SPECT/CT, PET/MRI, MRI, Optical Imaging, Ultrasound, Photoacoustic and other Cell, or Ex-vivo imaging systems. In addition, Dr. Habte is actively involved in various collaborative and independent research. Some of the recent and ongoing projects include integrated image data management system for preclinical and clinical translation, algorithm development for image segmentation, validation and optimization of image acquisition and analysis for preclinical and theranostic applications.

CURRENT ROLE AT STANFORD

Director, Stanford Center for Innovation, in In vivo Imaging

INSTITUTE AFFILIATIONS

- Research & Development Engr, Radiology- Molecular Imaging Program at Stanford

HONORS AND AWARDS

- Justice, Diversity, Equity and Inclusion Seed Grants Award in Radiology, Stanford, Department of Radiology (2021)
- Small Equipment Grant, Stanford School of Medicine (2019)
- Most cited paper award (2006-2008), Physica Medica (2009)
- Travel award IEEE nuclear science symposium and medical imaging conference., IEEE (2006)
- Travel award IEEE nuclear science symposium and medical imaging conference., IEEE (2006)
- Travel Award Annual Conference of the National Society of Black Physicists, National Society of Black Physicists (2003)
- UNESCO scholarship and travel award to attend the 1997 CERN School of Computing, CERN (1997)
- Full Ph.D. scholarship award, Swedish International Development Agency (SIDA) (1995-2001)
- Scholarship and travel award to attend a post-graduate course, State of Israel (1993)
- Scholarship to attend international workshops at the, International Centre for Theoretical Physics, Italy (1998, 1991, 1994)

EDUCATION AND CERTIFICATIONS

- Ph.D., Stockholm University, Sweden , Applied and Instrumentation Physics (2001)

- M.Sc, Stockholm University, Sweden , Applied Physics, (1996)
- B. Sc, University of Asmara, Eritrea , Physics (1988)

Publications

PUBLICATIONS

- **Immune cell identity behind the Ktrans mapping of mouse glioblastoma.** *Magnetic resonance imaging*
Zhang, Y., Keunen, O., Golebiewska, A., Gerosa, M., Wang, J., Ghobadi, S. N., Huang, A., Hou, Q., Habte, F. G., Li, N., Grant, G., Paulmurugan, R., Lee, et al
2023
- **Molecular Identity Changes of Tumor-Associated Macrophages and Microglia After Magnetic Resonance Imaging-Guided Focused Ultrasound-Induced Blood-Brain Barrier Opening in a Mouse Glioblastoma Model.** *Ultrasound in medicine & biology*
Zhang, Y., Wang, J., Ghobadi, S. N., Zhou, H., Huang, A., Gerosa, M., Hou, Q., Keunen, O., Golebiewska, A., Habte, F. G., Grant, G. A., Paulmurugan, R., Lee, et al
2023
- **Multimodal imaging of capsid and cargo reveals differential brain targeting and liver detargeting of systemically-administered AAVs.** *Biomaterials*
Seo, J. W., Ajenjo, J., Wu, B., Robinson, E., Raie, M. N., Wang, J., Tumbale, S. K., Buccino, P., Anders, D. A., Shen, B., Habte, F. G., Beinat, C., James, et al
2022: 121701
- **Web-Based Application for Biomedical Image Registry, Analysis, and Translation (BiRAT).** *Tomography (Ann Arbor, Mich.)*
Pemmaraju, R., Minahan, R., Wang, E., Schadl, K., Daldrup-Link, H., Habte, F.
2022; 8 (3): 1453-1462
- **Engineered Cell-Derived Vesicles Displaying Targeting Peptide and Functionalized with Nanocarriers for Therapeutic microRNA Delivery to Triple-Negative Breast Cancer in Mice.** *Advanced healthcare materials*
Bose, R. J., Kumar, U. S., Garcia-Marques, F., Zeng, Y., Habte, F., McCarthy, J. R., Pitteri, S., Massoud, T. F., Paulmurugan, R.
2021: e2101387
- **Non-invasive, neurotoxic surgery reduces seizures in a rat model of temporal lobe epilepsy.** *Experimental neurology*
Zhang, Y., Buckmaster, P. S., Qiu, L., Wang, J., Keunen, O., Ghobadi, S. N., Huang, A., Hou, Q., Li, N., Narang, S., Habte, F. G., Bertram, E. H., Lee, et al
2021: 113761
- **High-Throughput Whole-Plate Imaging of Cells for Multiple Biological Applications.** *Methods in molecular biology (Clifton, N.J.)*
Sukumar, U. K., Habte, F., Massoud, T. F., Paulmurugan, R.
2021; 2274: 367-384
- **Effects of Non-invasive, Targeted, Neuronal Lesions on Seizures in a Mouse Model of Temporal Lobe Epilepsy.** *Ultrasound in medicine & biology*
Zhang, Y., Zhou, H., Qu, H., Liao, C., Jiang, H., Huang, S., Ghobadi, S. N., Telichko, A., Li, N., Habte, F. G., Doyle, T., Woznak, J. P., Bertram, et al
2020
- **Trop2 is a driver of metastatic prostate cancer with neuroendocrine phenotype via PARP1.** *Proceedings of the National Academy of Sciences of the United States of America*
Hsu, E. C., Rice, M. A., Bermudez, A. n., Marques, F. J., Aslan, M. n., Liu, S. n., Ghoochani, A. n., Zhang, C. A., Chen, Y. S., Zlitni, A. n., Kumar, S. n., Nolley, R. n., Habte, et al
2020
- **Reconstructed Apoptotic Bodies as Targeted "Nano Decoys" to Treat Intracellular Bacterial Infections within Macrophages and Cancer Cells.** *ACS nano*
Bose, R. J., Tharmalingam, N. n., Garcia Marques, F. J., Sukumar, U. K., Natarajan, A. n., Zeng, Y. n., Robinson, E. n., Bermudez, A. n., Chang, E. n., Habte, F. n., Pitteri, S. J., McCarthy, J. R., Gambhir, et al
2020
- **Evaluation of integrin alphavbeta6 cystine knot PET tracers to detect cancer and idiopathic pulmonary fibrosis.** *Nature communications*
Kimura, R. H., Wang, L., Shen, B., Huo, L., Tummers, W., Filipp, F. V., Guo, H. H., Haywood, T., Abou-Elkacem, L., Baratto, L., Habte, F., Devulapally, R., Witney, et al
2019; 10 (1): 4673
- **Intranasal delivery of targeted polyfunctional gold-iron oxide nanoparticles loaded with therapeutic microRNAs for combined theranostic multimodality imaging and presensitization of glioblastoma to temozolomide.** *Biomaterials*

- Sukumar, U. K., Bose, R. J., Malhotra, M., Babikir, H. A., Afjei, R., Robinson, E., Zeng, Y., Chang, E., Habte, F., Sinclair, R., Gambhir, S. S., Massoud, T. F., Paulmurugan, et al
2019; 218: 119342
- **Nanomedicine for Spontaneous Brain Tumors: A Companion Clinical Trial** *ACS NANO*
Arami, H., Patel, C. B., Madsen, S. J., Dickinson, P. J., Davis, R. M., Zeng, Y., Sturges, B. K., Woolard, K. D., Habte, F. G., Akin, D., Sinclair, R., Gambhir, S. S.
2019; 13 (3): 2858–69
 - **Nanomedicine for Spontaneous Brain Tumors: A Companion Clinical Trial.** *ACS nano*
Arami, H., Patel, C. B., Madsen, S. J., Dickinson, P. J., Davis, R. M., Zeng, Y., Sturges, B. K., Woolard, K. D., Habte, F. G., Akin, D., Sinclair, R., Gambhir, S. S.
2019
 - **TESTING DIFFERENT COMBINATIONS OF ACOUSTIC PRESSURE AND DOSES OF QUINOLINIC ACID FOR INDUCTION OF FOCAL NEURON LOSS IN MICE USING TRANSCRANIAL LOW-INTENSITY FOCUSED ULTRASOUND** *ULTRASOUND IN MEDICINE AND BIOLOGY*
Zhang, Y., Liao, C., Qu, H., Huang, S., Jiang, H., Zhou, H., Abrams, E., Habte, F. G., Yuan, L., Bertram, E. H., Lee, K. S., Pauly, K., Buckmaster, et al
2019; 45 (1): 129–36
 - **Tumor Cell-Derived Extracellular Vesicle-Coated Nanocarriers: An Efficient Theranostic Platform for the Cancer-Specific Delivery of Anti-miR-21 and Imaging Agents** *ACS NANO*
Bose, R. C., Kumar, S., Zeng, Y., Afjei, R., Robinson, E., Lau, K., Bermudez, A., Habte, F., Pitteri, S. J., Sinclair, R., Willmann, J. K., Massoud, T. F., Gambhir, et al
2018; 12 (11): 10817–32
 - **Testing Different Combinations of Acoustic Pressure and Doses of Quinolinic Acid for Induction of Focal Neuron Loss in Mice Using Transcranial Low-Intensity Focused Ultrasound.** *Ultrasound in medicine & biology*
Zhang, Y., Liao, C., Qu, H., Huang, S., Jiang, H., Zhou, H., Abrams, E., Habte, F. G., Yuan, L., Bertram, E. H., Lee, K. S., Pauly, K. B., Buckmaster, et al
2018
 - **Quantification of Cerenkov Luminescence Imaging (CLI) Comparable With 3-D PET Standard Measurements** *MOLECULAR IMAGING*
Habte, F., Natarajan, A., Paik, D. S., Gambhir, S.
2018; 17
 - **Dosimetry Prediction for Clinical Translation of 64Cu-Pembrolizumab ImmunoPET Targeting Human PD-1 Expression.** *Scientific reports*
Natarajan, A., Patel, C. B., Habte, F., Gambhir, S. S.
2018; 8 (1): 633
 - **Dosimetry Prediction for Clinical Translation of 64Cu-Pembrolizumab ImmunoPET Targeting Human PD-1 Expression** *Scientific Reports*
Natarajan, A., Patel, C. B., Habte, F., Gambhir, S. S.
2018
 - **Tumor Cell-Derived Extracellular Vesicle-Coated Nanocarriers: An Efficient Theranostic Platform for the Cancer-Specific Delivery of Anti-miR-21 and Imaging Agents.** *ACS nano*
Jc Bose, R. n., Uday Kumar, S. n., Zeng, Y. n., Afjei, R. n., Robinson, E. n., Lau, K. n., Bermudez, A. n., Habte, F. n., Pitteri, S. J., Sinclair, R. n., Willmann, J. K., Massoud, T. F., Gambhir, et al
2018
 - **Quantification of Cerenkov Luminescence Imaging (CLI) Comparable With 3-D PET Standard Measurements.** *Molecular imaging*
Habte, F., Natarajan, A., Paik, D. S., Gambhir, S. S.
2018; 17: 1536012118788637
 - **Reporter gene imaging of targeted T cell immunotherapy in recurrent glioma.** *Science translational medicine*
Keu, K. V., Witney, T. H., Yaghoubi, S., Rosenberg, J., Kurien, A., Magnusson, R., Williams, J., Habte, F., Wagner, J. R., Forman, S., Brown, C., Allen-Auerbach, M., Czernin, et al
2017; 9 (373)
 - **Multimodality Molecular Imaging of Cardiac Cell Transplantation: Part II. In Vivo Imaging of Bone Marrow Stromal Cells in Swine with PET/CT and MR Imaging.** *Radiology*
Parashurama, N., Ahn, B., Ziv, K., Ito, K., Paulmurugan, R., Willmann, J. K., Chung, J., Ikeno, F., Swanson, J. C., Merk, D. R., Lyons, J. K., Yerushalmi, D., Teramoto, et al
2016; 280 (3): 826-836

- **Multimodality Molecular Imaging of Cardiac Cell Transplantation: Part I. Reporter Gene Design, Characterization, and Optical in Vivo Imaging of Bone Marrow Stromal Cells after Myocardial Infarction.** *Radiology*
Parashurama, N., Ahn, B., Ziv, K., Ito, K., Paulmurugan, R., Willmann, J. K., Chung, J., Ikeno, F., Swanson, J. C., Merk, D. R., Lyons, J. K., Yerushalmi, D., Teramoto, et al
2016; 280 (3): 815-825
- **A Thermo-Sensitive Delivery Platform for Topical Administration of Inflammatory Bowel Disease Therapies.** *Gastroenterology*
Sinha, S. R., Nguyen, L. P., Inayathullah, M., Malkovskiy, A., Habte, F., Rajadas, J., Habtezion, A.
2015; 149 (1): 52-55 e2
- **Cu-64-Labeled Divalent Cystine Knot Peptide for Imaging Carotid Atherosclerotic Plaques** *JOURNAL OF NUCLEAR MEDICINE*
Jiang, L., Tu, Y., Kimura, R. H., Habte, F., Chen, H., Cheng, K., Shi, H., Gambhir, S. S., Cheng, Z.
2015; 56 (6): 939-944
- **Semiquantitative Analysis of the Biodistribution of the Combined F-18-NaF and F-18-FDG Administration for PET/CT Imaging** *JOURNAL OF NUCLEAR MEDICINE*
Minamimoto, R., Mosci, C., Jamali, M., Barkhodari, A., Habte, F., Jackson, T., Mitra, E., Gambhir, S. S., Igaru, A.
2015; 56 (5): 688-694
- **PET Imaging Carotid Atherosclerotic Plaque Using Divalent Knottin**
Jiang, L., Tu, Y., Kimura, R., Habte, F., Chen, H., Cheng, K., Shi, H., Gambhir, S., Cheng, Z.
SOC NUCLEAR MEDICINE INC.2015
- **Optical coherence contrast imaging using gold nanorods in living mice eyes** *CLINICAL AND EXPERIMENTAL OPHTHALMOLOGY*
de la Zerda, A., Prabhulkar, S., Perez, V. L., Ruggeri, M., Paranjape, A. S., Habte, F., Gambhir, S. S., Awdeh, R. M.
2015; 43 (4): 358-366
- **A simple model for deep tissue attenuation correction and large organ analysis of Cerenkov luminescence imaging** *Medical Imaging - Physics of Medical Imaging*
Habte, F., Natarajan, A., Paik, D. S., Gambhir, S. S.
SPIE-INT SOC OPTICAL ENGINEERING.2014
- **Impact of a Multiple Mice Holder on Quantitation of High-Throughput MicroPET Imaging With and Without Ct Attenuation Correction.** *Molecular imaging and biology*
Habte, F., Ren, G., Doyle, T. C., Liu, H., Cheng, Z., Paik, D. S.
2013; 15 (5): 569-575
- **Evaluation of Zr-89-rituximab Tracer by Cerenkov Luminescence Imaging and Correlation with PET in a Humanized Transgenic Mouse Model to Image NHL** *MOLECULAR IMAGING AND BIOLOGY*
Natarajan, A., Habte, F., Liu, H., Sathirachinda, A., Hu, X., Cheng, Z., Nagamine, C. M., Gambhir, S. S.
2013; 15 (4): 468-475
- **In situ study of the impact of inter- and intra-reader variability on region of interest (ROI) analysis in preclinical molecular imaging.** *American journal of nuclear medicine and molecular imaging*
Habte, F., Budhiraja, S., Keren, S., Doyle, T. C., Levin, C. S., Paik, D. S.
2013; 3 (2): 175-181
- **A Brain Tumor Molecular Imaging Strategy using a New Triple-Modality MRI-Photoacoustic-Raman Nanoparticle** *Conference on Photons Plus Ultrasound - Imaging and Sensing*
de la Zerda, A., Kircher, M. F., Jokerst, J. V., Zavaleta, C. L., Kempen, P. J., Mitra, E., Pitter, K., Huang, R., Campos, C., Habte, F., Sinclair, R., Brennan, C. W., Mellinghoff, et al
SPIE-INT SOC OPTICAL ENGINEERING.2013
- **Remodeling of Endogenous Mammary Epithelium by Breast Cancer Stem Cells** *STEM CELLS*
Parashurama, N., Lobo, N. A., Ito, K., Mosley, A. R., Habte, F. G., Zabala, M., Smith, B. R., Lam, J., Weissman, I. L., Clarke, M. F., Gambhir, S. S.
2012; 30 (10): 2114-2127
- **Development of a Novel Long-Lived ImmunoPET Tracer for Monitoring Lymphoma Therapy in a Humanized Transgenic Mouse Model** *BIOCONJUGATE CHEMISTRY*
Natarajan, A., Habte, F., Gambhir, S. S.
2012; 23 (6): 1221-1229

- **A brain tumor molecular imaging strategy using a new triple-modality MRI-photoacoustic-Raman nanoparticle** *NATURE MEDICINE*
Kircher, M. F., de la Zerda, A., Jokerst, J. V., Zavaleta, C. L., Kempen, P. J., Mittra, E., Pitter, K., Huang, R., Campos, C., Habte, F., Sinclair, R., Brennan, C. W., Mellinghoff, et al
2012; 18 (5): 829-U235
- **Enhancing Pixelated Fast-Neutron Block Detector Performance Using a Slotted Light Guide**
Habte, F., Blackston, M. A., Hausladen, P. A., Fabris, L., IEEE
IEEE.2009: 2403-+
- **The Use of Gamma-Ray Imaging to Improve Portal Monitor Performance** *IEEE TRANSACTIONS ON NUCLEAR SCIENCE*
Ziock, K. P., Collins, J., Cunningham, M., Fabris, L., Gee, T., Goddard, J., Habte, F., Karnowski, T.
2008; 55 (6): 3654-3664
- **A Fieldable-Prototype, Large-Area, Gamma-Ray Imager for Orphan Source Search** *IEEE TRANSACTIONS ON NUCLEAR SCIENCE*
Ziock, K. P., Fabris, L., Carr, D., Collins, J., Cunningham, M., Habte, F., Karnowski, T., Marchant, W.
2008; 55 (6): 3643-3653
- **Prototype parallel readout system for position sensitive PMT based gamma ray imaging systems** *IEEE TRANSACTIONS ON NUCLEAR SCIENCE*
Habte, F., Olcott, P. D., Levin, C. S., Foudray, A. M.
2007; 54 (1): 60-65
- **Positioning annihilation photon interactions in a thin LSO crystal sheet with a position-sensitive avalanche photodiode** *IEEE TRANSACTIONS ON NUCLEAR SCIENCE*
Foudray, A. M., Habte, F., Levin, C. S., Olcott, P. D.
2006; 53 (5): 2549-2556
- **Count rate studies of a box-shaped PET breast imaging system comprised of position sensitive avalanche photodiodes utilizing Monte Carlo simulation** *Workshop on Nuclear Radiology of Breast Cancer*
Foudray, A. M., Habte, F., Chinn, G., Zhang, J., Levin, C. S.
IST EDITORIALI POLGRAFICI INT.2006: 64-67
- **Fully 3-D List-Mode OSEM Accelerated by Graphics Processing Units** *15th International Workshop on Room-Temperature Semiconductor X- and Gamma-Ray Detectors/ 2006 IEEE Nuclear Science Symposium*
Pratx, G., Chinn, G., Habte, F., Olcott, P., Levin, C.
IEEE.2006: 2196-2202
- **Impact of high energy resolution detectors on the performance of a PET system dedicated to breast cancer imaging** *Workshop on Nuclear Radiology of Breast Cancer*
Levin, C. S., Foudray, A. M., Habte, F.
IST EDITORIALI POLGRAFICI INT.2006: 28-34
- **Evaluation of a dual-panel PET camera design to breast cancer imaging** *Workshop on Nuclear Radiology of Breast Cancer*
Zhang, J., Chinn, G., Foudray, A. M., Habte, F., Olcott, P., Levin, C. S.
IST EDITORIALI POLGRAFICI INT.2006: 94-98
- **Investigation of scintillation light multiplexing for PET detectors based on position sensitive avalanche photodiodes** *Nuclear Science Symposium/Medical Imaging Conference*
Habte, F., Olcott, P. D., Levin, C. S., Foudray, A. M.
IEEE.2005: 2027-2030