Stanford

Marios Georgiadis

Instructor, Radiology

Bio

BIO

Marios is an Instructor of Neuroimaging in the Department of Radiology.

His research focuses mainly on studying brain microstructure using cutting edge imaging (advanced X-ray, MRI, optical, and spatial biology approaches), with a particular focus on Alzheimer's disease hippocampi, neurodegeneration, and a special interest in myelin and iron.
He is also actively involved in projects related to imaging and modeling brain trauma, exosome signatures of neurodegeneration, and imaging the brain using advanced forms of electron and light microscopy.

His current research is being supported by NIH, the Alzheimer's Association, the American Society of Neuroradiology, the National Alzheimer's Coordinating Center (NACC), and the Stanford ADRC.

Marios is a mechanical engineer by training (School of Mechanical Engineering, National Technical University of Athens, Greece). His thesis "Closed-loop force control of a haptic surgical simulator", was performed in the Control Systems Lab of Prof. Evangelos Papadopoulos.

In 2011 he obtained his MSc in Biomedical Engineering from ETH Zurich (Swiss Federal Institute of Technology). He performed his thesis in IBM Research on "Advanced pathology using the Microfluidic Probe", under Emmanuel Delamarche and Govind Kaigala, and was awarded the ETH medal for this work.

He completed his PhD in Bone Biomechanics in the lab of Prof. Ralph Muller in ETH Zurich, where he developed X-ray scattering-based methods to investigate bone microstructure in 3D, research that earned him the 2nd Student Award from the European Society for Biomechanics in 2015.

In 2016 he started using imaging methods to study brain microstructure, in the lab of Prof. Markus Rudin, in the Institute for Biomedical Engineering of ETH Zurich. There, he combined X-ray scattering with DTI, histology and CLARITY for studying rodent brain.

In 2017 he joined the MRI Biophysics group of Profs. Els Fieremans and Dmitry Novikov in New York University School of Medicine, to study human and mouse brain microstructure using X-ray scattering and diffusion MRI.

He is in the Translational Neuroimaging lab, headed by Dr Michael Zeineh, since 2019.

His research on myelin in mouse and human brain using X-ray scattering has been supported twice by the Swiss National Science Foundation.

ACADEMIC APPOINTMENTS

- Instructor, Radiology

HONORS AND AWARDS

- American Society of Neuroradiology Grantee, Foundation of the American Society of Neuroradiology (2024)
- Alzheimer's Association Research Fellow, Alzheimer's Association (2024)
- Swiss National Foundation Advanced Postdoc Mobility Fellow, Swiss National Science Foundation (2019)
- Swiss National Foundation Early Postdoc Mobility Fellow, Swiss National Science Foundation (2017)
- 2nd student award, European Society for Biomechanics (2015)
- ETH Medal for Exceptional Master's Thesis, ETH Zurich (2012)

Teaching

COURSES

2025-26

- The Magic of Medical Imaging: RAD 21Q (Win)

2024-25

- The Magic of Medical Imaging: RAD 21Q (Aut)

2023-24

- The Magic of Medical Imaging: RAD 21Q (Aut)

Publications

PUBLICATIONS

- **Characterizing ferrous versus ferric iron in Alzheimer's disease using X-ray fluorescence imaging and XANES spectroscopy.** *Journal of Alzheimer's disease : JAD*
  Tran, D., Georgiadis, M., DiGiacomo, P., Nirschl, J., Cobos, I., Rosenberg, J., Edwards, N., Bone, S., Webb, S., Zeineh, M.
  2026: 13872877261435561

- **Biomarkers.** *Alzheimer's & dementia : the journal of the Alzheimer's Association*
  Dunne, R. A., Taghavi, H. M., DiGiacomo, P., Maclaren, J., Bell, M., Carlson, M. L., Mormino, E. C., Henderson, V. W., Spincemaille, P., Zhuang, H., Wang, Y., Rutt, B. S., Georgiadis, et al
  2025; 21 Suppl 2: e106116

- **Alzheimer's Imaging Consortium.** *Alzheimer's & dementia : the journal of the Alzheimer's Association*
  Georgiadis, M., Auf der Heiden, F., Nirschl, J., Liu, A., Taghavi, H. M., Amunts, K., Axer, M., Menzel, M., Zeineh, M.
  2025; 21 Suppl 8 (Suppl 8): e110123

- **Basic Science and Pathogenesis.** *Alzheimer's & dementia : the journal of the Alzheimer's Association*
  Georgiadis, M., Auf der Heiden, F., Nirschl, J., Liu, A., Taghavi, H. M., Amunts, K., Axer, M., Menzel, M., Zeineh, M.
  2025; 21 Suppl 1 (Suppl 1): e106440

- **Alzheimer's Imaging Consortium.** *Alzheimer's & dementia : the journal of the Alzheimer's Association*
  Liu, A., Simmons, D., Longo, F., Zeineh, M., Georgiadis, M.
  2025; 21 Suppl 8 (Suppl 8): e110151

- **Biomarkers.** *Alzheimer's & dementia : the journal of the Alzheimer's Association*
  Liu, A., Simmons, D., Longo, F., Zeineh, M., Georgiadis, M.
  2025; 21 Suppl 2: e101618

- **Alzheimer's Imaging Consortium.** *Alzheimer's & dementia : the journal of the Alzheimer's Association*
  Dunne, R. A., Taghavi, H. M., DiGiacomo, P., Maclaren, J., Bell, M., Carlson, M. L., Mormino, E. C., Henderson, V. W., Spincemaille, P., Zhuang, H., Wang, Y., Rutt, B. S., Georgiadis, et al
  2025; 21 Suppl 8 (Suppl 8): e109954

- **Biomarkers.** *Alzheimer's & dementia : the journal of the Alzheimer's Association*
  Taghavi, H. M., Karimpoor, M., van Staalduinen, E., Young, C. B., Georgiadis, M., Carlson, M. L., Romero, A., Trelle, A. N., Vossler, H., Yutsis, M., Rosenberg, J., Davidzon, G. A., Zaharchuk, et al
  2025; 21 Suppl 2 (Suppl 2): e096159

- **Micron-resolution fiber mapping in histology independent of sample preparation.** *Nature communications*
  Georgiadis, M., Auf der Heiden, F., Abbasi, H., Ettema, L., Nirschl, J., Taghavi, H. M., Wakatsuki, M., Liu, A., Ho, W. H., Carlson, M., Doukas, M., Koppes, S. A., Keereweer, et al
  2025; 16 (1): 9572

- **Precise MRI-histology coregistration of paraffin-embedded tissue with blockface imaging.** *Imaging neuroscience (Cambridge, Mass.)*
  Wang, Y., Ho, W., Huszar, I. N., DiGiacomo, P., Taghavi, H. M., Tao, L., Choi, M., Nguyen, N., Leventis, S., Camarillo, D. B., Schlömer, P., Axer, M., Shao, et al
  2025; 3

- **Elevated tau in the piriform cortex in Alzheimer's but not Parkinson's disease using PET-MR.** *Alzheimer's & dementia (Amsterdam, Netherlands)*
  Moein Taghavi, H., Karimpoor, M., van Staalduinen, E. K., Young, C. B., Georgiadis, M., Leventis, S., Carlson, M., Romero, A., Trelle, A., Vossler, H., Yutsis, M., Rosenberg, J., Davidzon, et al
  2024; 16 (4): e70040

- **Uncovering microstructural architecture from histology.** *bioRxiv : the preprint server for biology*
  Georgiadis, M., Auf der Heiden, F., Abbasi, H., Ettema, L., Nirschl, J., Taghavi, H. M., Wakatsuki, M., Liu, A., Ho, W. H., Carlson, M., Doukas, M., Koppes, S. A., Keereweer, et al
  2024

- **Microstructural Alterations in Tract Development in College Football and Volleyball Players: A Longitudinal Diffusion MRI Study.** *Neurology*
  Goubran, M., Mills, B. D., Georgiadis, M., Karimpoor, M., Mouchawar, N., Sami, S., Dennis, E. L., Akers, C., Mitchell, L., Boldt, B., Douglas, D., DiGiacomo, P. S., Rosenberg, et al
  2023

- **Longitudinal alterations of cerebral blood flow in high-contact sports.** *Annals of neurology*
  Karimpoor, M., Georgiadis, M., Zhao, M. Y., Goubran, M., Moein Taghavi, H., Mills, B. D., Tran, D., Mouchawar, N., Sami, S., Wintermark, M., Grant, G., Camarillo, D. B., Moseley, et al
  2023

- **Using light and X-ray scattering to untangle complex neuronal orientations and validate diffusion MRI.** *eLife*
  Menzel, M., GraSSel, D., Rajkovic, I., Zeineh, M. M., Georgiadis, M.
  2023; 12

- **Imaging crossing fibers in mouse, pig, monkey, and human brain using small-angle X-ray scattering.** *Acta biomaterialia*
  Georgiadis, M., Menzel, M., Reuter, J. A., Born, D., Kovacevich, S., Alvarez, D., Taghavi, H. M., Schroeter, A., Rudin, M., Gao, Z., Guizar-Sicairos, M., Weiss, T. M., Axer, et al
  2023

- **SAXS imaging reveals optimized osseointegration properties of bioengineered oriented 3D-PLGA/aCaP scaffolds in a critical size bone defect model.** *Biomaterials*
  Casanova, E. A., Rodriguez-Palomo, A., Stahli, L., Arnke, K., Groninger, O., Generali, M., Neldner, Y., Tiziani, S., Dominguez, A. P., Guizar-Sicairos, M., Gao, Z., Appel, C., Nielsen, et al
  2023; 294: 121989

- **Scanning The Brain Using X-Ray Scattering**

Georgiadis, M.
INT UNION CRYSTALLOGRAPHY.2022: A37

- **Iron and Alzheimer's Disease: From Pathology to Imaging.** *Frontiers in human neuroscience*
  Tran, D., DiGiacomo, P., Born, D. E., Georgiadis, M., Zeineh, M.
  2022; 16: 838692

- **The Presence of the Temporal Horn Exacerbates the Vulnerability of Hippocampus During Head Impacts.** *Frontiers in bioengineering and biotechnology*
  Zhou, Z., Li, X., Domel, A. G., Dennis, E. L., Georgiadis, M., Liu, Y., Raymond, S. J., Grant, G., Kleiven, S., Camarillo, D., Zeineh, M.
  2022; 10: 754344

- **Towards a comprehensive delineation of white matter tract-related deformation.** *Journal of neurotrauma*
  Zhou, Z., Li, X., Liu, Y., Fahlstedt, M., Georgiadis, M., Zhan, X., Raymond, S. J., Grant, G., Kleiven, S., Camarillo, D. B., Zeineh, M.
  2021

- **Neuroradiologic Evaluation of MRI in High-Contact Sports.** *Frontiers in neurology*
  McAllister, D., Akers, C., Boldt, B., Mitchell, L. A., Tranvinh, E., Douglas, D., Goubran, M., Rosenberg, J., Georgiadis, M., Karimpoor, M., DiGiacomo, P., Mouchawar, N., Grant, et al
  2021; 12: 701948

- **Nanostructure-specific X-ray tomography reveals myelin levels, integrity and axon orientations in mouse and human nervous tissue.** *Nature communications*
  Georgiadis, M., Schroeter, A., Gao, Z., Guizar-Sicairos, M., Liebi, M., Leuze, C., McNab, J. A., Balolia, A., Veraart, J., Ades-Aron, B., Kim, S., Shepherd, T., Lee, et al
  2021; 12 (1): 2941

- **Validation study of small-angle X-ray scattering tensor tomography** *JOURNAL OF SYNCHROTRON RADIATION*
  Guizar-Sicairos, M., Georgiadis, M., Liebi, M.
  2020; 27: 779–87

- **Retrieving neuronal orientations using 3D scanning SAXS and comparison with diffusion MRI.** *NeuroImage*
  Georgiadis, M., Schroeter, A., Gao, Z., Guizar-Sicairos, M., Novikov, D., Fieremans, E., Rudin, M.
  2019: 116214

- **High-speed tensor tomography: iterative reconstruction tensor tomography (IRTT) algorithm** *ACTA CRYSTALLOGRAPHICA A-FOUNDATION AND ADVANCES*
  Gao, Z., Guizar-Sicairos, M., Lutz-Bueno, V., Schroter, A., Liebi, M., Rudin, M., Georgiadis, M.
  2019; 75: 223–38

- **Small-angle X-ray scattering tensor tomography: model of the three-dimensional reciprocal-space map, reconstruction algorithm and angular sampling requirements** *ACTA CRYSTALLOGRAPHICA A-FOUNDATION AND ADVANCES*
  Liebi, M., Georgiadis, M., Kohlbrecher, J., Holler, M., Raabe, J., Usov, I., Menzel, A., Schneider, P., Bunk, O., Guizar-Sicairos, M.
  2018; 74: 12–24

- **Ultrastructure Organization of Human Trabeculae Assessed by 3D sSAXS and Relation to Bone Microarchitecture** *PLOS ONE*
  Georgiadis, M., Guizar-Sicairos, M., Gschwend, O., Hangartner, P., Bunk, O., Mueller, R., Schneider, P.
  2016; 11 (8): e0159838

- **Techniques to assess bone ultrastructure organization: orientation and arrangement of mineralized collagen fibrils** *JOURNAL OF THE ROYAL SOCIETY INTERFACE*
  Georgiadis, M., Mueller, R., Schneider, P.
  2016; 13 (119)

- **Nanostructure surveys of macroscopic specimens by small-angle scattering tensor tomography** *NATURE*
  Liebi, M., Georgiadis, M., Menzel, A., Schneider, P., Kohlbrecher, J., Bunk, O., Guizar-Sicairos, M.
  2015; 527 (7578): 349-+

- **3D scanning SAXS: A novel method for the assessment of bone ultrastructure orientation** *BONE*
  Georgiadis, M., Guizar-Sicairos, M., Zwahlen, A., Trussel, A. J., Bunk, O., Muller, R., Schneider, P.
  2015; 71: 42–52

- **Advanced glycation end-products diminish tendon collagen fiber sliding** *MATRIX BIOLOGY*
  Li, Y., Fessel, G., Georgiadis, M., Snedeker, J. G.
  2013; 32 (3-4): 169–77
- **Micro-immunohistochemistry using a microfluidic probe** *LAB ON A CHIP*
  Lovchik, R. D., Kaigala, G. V., Georgiadis, M., Delamarche, E.
  2012; 12 (6): 1040–43