

Stanford



Craig Levin

Professor of Radiology (Molecular Imaging Program at Stanford/Nuclear Medicine) and, by courtesy, of Physics, of Electrical Engineering and of Bioengineering
Radiology - Rad/Molecular Imaging Program at Stanford

 NIH Biosketch available Online

CONTACT INFORMATION

- **Alternate Contact**

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Bio

BIO

Dr. Craig S. Levin is a Professor of Radiology and, by Courtesy, of Physics, Electrical Engineering, and Bioengineering at Stanford. He is a founding member of the Molecular Imaging Program at Stanford, and Principal Investigator and Director of the NIH-NCI funded T32 Stanford Molecular Imaging Scholars postdoctoral training program. He received his M.S., M.Phil, and Ph.D. degrees in Physics from Yale University. An internationally recognized researcher in the field of molecular imaging he has nearly 200 peer-reviewed publications and 40 patents awarded or pending. He directs a 20-member laboratory that explores new concepts in instrumentation and software algorithms for molecular imaging, introduces these new tools into clinical and pre-clinical imaging studies of cancer, heart disease and neurological disorders, and partners with industry to disseminate some of these technologies into products used for patient care throughout the world. To support his research, he has generated substantial NIH funding as Principal Investigator in addition to numerous grants from other government, industry, and private institutions. He lectured in a Nobel symposium in 2007, and was elected into the American Institute for Medical and Biological Engineering's College of Fellows and was given the Academy of Radiology Research Distinguished Investigator Recognition Award.

ACADEMIC APPOINTMENTS

- Professor, Radiology - Rad/Molecular Imaging Program at Stanford
- Professor (By courtesy), Electrical Engineering
- Professor (By courtesy), Physics
- Professor (By courtesy), Bioengineering
- Member, Bio-X
- Member, Cardiovascular Institute
- Member, Wu Tsai Human Performance Alliance
- Member, Stanford Cancer Institute

ADMINISTRATIVE APPOINTMENTS

- Director and PI of the Stanford Molecular Imaging Scholars Postdoctoral Training Program, Stanford University, (2009-2026)
- Chair of Faculty Search Committee, Department of Radiology, (2009-2010)

- Chair of Faculty Search Committee, Department of Radiology, (2008-2009)
- Chair of Faculty Search Committee, Department of Radiology, (2007-2008)
- Chair of Faculty Search Committee, Department of Radiology, (2006-2007)
- Co-Director, Stanford Center for Innovation in In Vivo Imaging, (2004- present)

HONORS AND AWARDS

- Phi Eta Sigma National Honors, University of California at Los Angeles (1981)
- Physics, Mathematics, and College Honors Programs, University of California at Los Angeles (1981-5)
- Stanford Linear Accelerator Center Undergraduate Fellowship, University of California at Los Angeles (1983)
- Phi Beta Kappa National Honors, University of California at Los Angeles (1984)
- Marilyn F. Lohr Award in Physics, University of California at Los Angeles (1984)
- E. Lee Kinsey Award in Physics, University of California at Los Angeles (1985)
- Sherwood Prize in Mathematics, University of California at Los Angeles (1985)
- B.S. Summa Cum Laude, University of California at Los Angeles (1985)
- Sigma Pi Sigma National Honors in Physics, University of California at Los Angeles (1985)
- Full Tuition and Research Fellowship, Yale University (1985-93)
- Bates Graduate Fellowship, Jonathan Edwards College, Yale University (1987-91)
- National Research Service Award, National Institutes of Health (1993-5)
- Pilot Research Award, Society of Nuclear Medicine (1996)

PROFESSIONAL EDUCATION

- Ph.D., Yale University , Physics (1993)
- M.Phil., Yale University , Physics (1987)
- M.S., Yale University , Physics (1987)
- B.S., UCLA , Physics and Mathematics (1985)

LINKS

- Molecular Imaging Instrumentation Laboratory: <http://miil.stanford.edu>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Molecular Imaging Instrumentation Laboratory

Our research interests involve the development of novel instrumentation and software algorithms for in vivo imaging of cellular and molecular signatures of disease in humans and small laboratory animal subjects. These new cameras efficiently image radiation emissions in the form of positrons, annihilation photons, gamma rays, and light from molecular probes developed to target molecular signals from deep within tissue of live subjects. The goals of the instrumentation projects are to push the sensitivity and spatial, spectral, and/or temporal resolutions as far as physically possible. The algorithm goals are to understand the physical system comprising the subject tissues, radiation transport, and imaging system, and to provide the best available image quality and quantitative accuracy. The work involves computer modeling, position sensitive sensors, readout electronics, data acquisition, image formation, image processing, and data/image analysis algorithms, and incorporating these innovations into practical imaging devices. The ultimate goal is to introduce these new imaging tools into studies of molecular mechanisms and treatments of disease within living subjects.

CLINICAL TRIALS

- Efficacy of Gamma Camera Used Intraoperatively for ID of Sentinel Lymph Nodes w/ Lymphoscintigraphy, Not Recruiting

Teaching

COURSES

2024-25

- Physics and Engineering Principles of Multi-modality Molecular Imaging of Living Subjects: BIOE 222, BMP 222, RAD 222 (Aut)
- Physics and Engineering of Radionuclide-based Medical Imaging: BIOE 221, BMP 221, RAD 221 (Win)

2023-24

- Physics and Engineering Principles of Multi-modality Molecular Imaging of Living Subjects: BIOE 222, BMP 222, RAD 222 (Aut)

2022-23

- Physics and Engineering Principles of Multi-modality Molecular Imaging of Living Subjects: BIOE 222, BMP 222, RAD 222 (Aut)

2021-22

- Physics and Engineering Principles of Multi-modality Molecular Imaging of Living Subjects: BIOE 222, RAD 222 (Aut)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Meysam Dadgar, Wen He, Muhammad Nasir Ullah, Zhixiang Zhao

Doctoral Dissertation Advisor (AC)

Myungheon(Young) Chin, Jonathan Fisher, West Foster, Sarah Zou

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (Phd Program)
- Biophysics (Phd Program)

Publications

PUBLICATIONS

- **PETcoil: first results from a second-generation RF-penetrable TOF-PET brain insert for simultaneous PET/MRI.** *Physics in medicine and biology*
Dong, Q., Ullah, M. N., Innes, D. R., Watkins, R. D., Chang, C., Zou, S. J., Groll, A., Sacco, I., Chinn, G., Levin, C. S.
2024
- **Self-normalization for a 1-mm³ resolution clinical PET system using deep learning.** *Physics in medicine and biology*
Chin, M., Jafaritadi, M., Franco, A. B., Ullah, M. N., Chinn, G., Innes, D. R., Levin, C. S.
2024
- **Context-Aware Transformer GAN for Direct Generation of Attenuation and Scatter Corrected PET Data** *IEEE TRANSACTIONS ON RADIATION AND PLASMA MEDICAL SCIENCES*
Jafaritadi, M., Anaya, E., Chinn, G., Rosenberg, J., Liang, T., Levin, C. S.
2024; 8 (6): 677-689
- **Deep generative denoising networks enhance quality and accuracy of gated cardiac PET data.** *Annals of nuclear medicine*
Jafaritadi, M., Teuho, J., Lehtonen, E., Klen, R., Saraste, A., Levin, C. S.
2024
- **Toward "super-scintillation" with nanomaterials and nanophotonics.** *Nanophotonics*
Carr Delgado, H., Moradifar, P., Chinn, G., Levin, C. S., Dionne, J. A.

2024; 13 (11): 1953-1962

- **Toward "super-scintillation" with nanomaterials and nanophotonics** *NANOPHOTONICS*
Delgado, H., Moradifar, P., Chinn, G., Levin, C. S., Dionne, J. A.
2024
- **A Scalable Dynamic TOT Circuit for a 100 ps TOF-PET Detector Design to Improve Energy Linearity and Dynamic Range** *IEEE TRANSACTIONS ON RADIATION AND PLASMA MEDICAL SCIENCES*
Pourashraf, S., Cates, J. W., Levin, C. S.
2024; 8 (3): 237-247
- **PET System Technology: Theoretical Aspects and Experimental Methodology.** *Methods in molecular biology (Clifton, N.J.)*
Gonzalez-Montoro, A., Levin, C. S.
2024; 2729: 343-369
- **Compact FPGA-Based Data Acquisition System for a High-Channel, High-Count-Rate TOF-PET Insert for Brain PET/MRI** *IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT*
Dong, Q., Sajedi, S., Cui, K., Levin, C. S.
2024; 73
- **MRI compatibility study of a prototype radiofrequency penetrable oval PET insert at 3 T.** *Japanese journal of radiology*
Akram, M. S., Nishikido, F., Levin, C. S., Takyu, S., Obata, T., Yamaya, T.
2023
- **A simulation of a high-resolution cadmium zinc telluride positron emission tomography system.** *Medical physics*
Stanford-Hill, R., Groll, A., Levin, C. S.
2023
- **Simulation of ionization charge carrier cascade time and density for a new radiation detection method based on modulation of optical properties.** *Medical physics*
Jeong, D., Tao, L., Song, X. R., Adams, Z., Zhang, X., Wang, J., Levin, C. S.
2023
- **Design and Characterization of the Detector Readout Electronics Used in PET<i>coils</i>: an RF-Penetrable TOF-PET Insert for PET/MRI** *IEEE TRANSACTIONS ON RADIATION AND PLASMA MEDICAL SCIENCES*
Dong, Q., Sacco, I., Chang, C., Levin, C. S.
2023; 7 (8): 819-829
- **Study on the radiofrequency transparency of partial-ring oval-shaped prototype PET inserts in a 3 T clinical MRI system.** *Radiological physics and technology*
Akram, M. S., Levin, C. S., Nishikido, F., Takyu, S., Obata, T., Yamaya, T.
2023
- **Sparse SiPM Pixel Arrangement for a TOF-PET Detector Design that Achieves 100 ps Coincidence Time Resolution** *IEEE TRANSACTIONS ON RADIATION AND PLASMA MEDICAL SCIENCES*
Cates, J. W., Levin, C. S.
2023; 7 (7): 665-672
- **Investigation of Faraday cage materials with low eddy current and high RF shielding effectiveness for PET/MRI applications.** *Physics in medicine and biology*
Dong, Q., Adams, Z., Watkins, R. D., Chang, C. M., Lee, B. J., Levin, C. S.
2023
- **The PETcoil project: PET performance evaluation of two detector modules for a second generation RF-penetrable TOF-PET brain dedicated insert for simultaneous PET/MRI.** *Physics in medicine and biology*
Dong, Q., Chang, C., Lee, B. J., Sacco, I., Sajedi, S., Adams, Z., Fischer, P., Levin, C. S.
2023
- **Study of compatibility between a 3T MR system and detector modules for a second generation RF-penetrable TOF-PET insert for simultaneous PET/MRI.** *Medical physics*
Dong, Q., Adams, Z., Watkins, R. D., Lee, B. J., Chang, C. M., Sacco, I., Levin, C. S.

2023

- **Design considerations for PET detectors with 100 picoseconds coincidence time resolution** *NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT*
Gonzalez-Montoro, A., Pourashraf, S., Lee, M. S., Cates, J. W., Levin, C. S.
2023; 1045
- **Predicting final ischemic stroke lesions from initial diffusion-weighted images using a deep neural network.** *NeuroImage. Clinical*
Nazari-Farsani, S., Yu, Y., Armino, R. D., Lansberg, M., Liebeskind, D. S., Albers, G., Christensen, S., Levin, C. S., Zaharchuk, G.
2022; 37: 103278
- **Study of Annihilation Photon Pair Coincidence Time Resolution Using Prompt Photon Emissions in New Perovskite Bulk Crystals** *IEEE TRANSACTIONS ON RADIATION AND PLASMA MEDICAL SCIENCES*
Tao, L., He, Y., Kanatzidis, M. G., Levin, C. S.
2022; 6 (7): 804-810
- **Promising Detector Concepts to Advance Coincidence Time Resolution for Time-of-Flight Positron Emission Tomography**
Levin, C. S.
POLISH ACAD SCIENCES INST PHYSICS.2022: 422-427
- **Study of Annihilation Photon Pair Coincidence Time Resolution Using Prompt Photon Emissions in New Perovskite Bulk Crystals.** *IEEE transactions on radiation and plasma medical sciences*
Tao, L., He, Y., Kanatzidis, M. G., Levin, C. S.
2022; 6 (7): 804-810
- **Advances in Detector Instrumentation for PET.** *Journal of nuclear medicine : official publication, Society of Nuclear Medicine*
Gonzalez-Montoro, A., Ullah, M. N., Levin, C. S.
2022; 63 (8): 1138-1144
- **Investigation of Electronic Signal Processing Chains for a Prototype TOF-PET System With 100-ps Coincidence Time Resolution.** *IEEE transactions on radiation and plasma medical sciences*
Pourashraf, S., Gonzalez-Montoro, A., Lee, M. S., Cates, J. W., Won, J. Y., Lee, J. S., Levin, C. S.
2022; 6 (6): 690-696
- **Cherenkov Radiation-Based Coincidence Time Resolution Measurements in BGO Scintillators** *FRONTIERS IN PHYSICS*
Gonzalez-Montoro, A., Pourashraf, S., Cates, J. W., Levin, C. S.
2022; 10
- **Investigation of Electronic Signal Processing Chains for a Prototype TOF-PET System with 100 ps Coincidence Time Resolution** *IEEE Transactions on Radiation and Plasma Medical Sciences*
Pourashraf, S., Gonzalez-Montoro, A., Lee, M., Cates, J. W., Won, J. Y., Lee, J. S., Levin, C. S.
2022; 6 (6): 690 - 696
- **Application of Artificial Intelligence in PET Instrumentation.** *PET clinics*
Ullah, M. N., Levin, C. S.
2022; 17 (1): 175-182
- **Study of optical reflectors for a 100ps coincidence time resolution TOF-PET detector design.** *Biomedical physics & engineering express*
Gonzalez-Montoro, A., Pourashraf, S., Lee, M. S., Cates, J. W., Levin, C. S.
2021
- **Reduced Acquisition Time Per Bed Position for PET/MRI Using 68Ga-RM2 or 68Ga-PSMA11 in Patients With Prostate Cancer: A Retrospective Analysis.** *AJR. American journal of roentgenology*
Duan, H., Baratto, L., Hatami, N., Liang, T., Levin, C. S., Khalighi, M. M., Iagaru, A.
2021
- **High-resolution time-of-flight PET detector with 100 ps coincidence time resolution using a side-coupled phoswich configuration.** *Physics in medicine and biology*
Lee, M. S., Cates, J. W., Gonzalez-Montoro, A., Levin, C. S.
2021; 66 (12)

- **New PET technologies - embracing progress and pushing the limits.** *European journal of nuclear medicine and molecular imaging*
Aide, N., Lasnon, C., Kesner, A., Levin, C. S., Buvat, I., Igaru, A., Hermann, K., Badawi, R. D., Cherry, S. R., Bradley, K. M., McGowan, D. R.
2021
- **Results of a Prospective Trial to Compare 68Ga-DOTA-TATE with SiPM-Based PET/CT vs. Conventional PET/CT in Patients with Neuroendocrine Tumors.** *Diagnostics (Basel, Switzerland)*
Baratto, L., Toriihara, A., Hatami, N., Aparici, C. M., Davidzon, G., Levin, C. S., Igaru, A.
2021; 11 (6)
- **Evolution of PET Detectors and Event Positioning Algorithms Using Monolithic Scintillation Crystals** *IEEE TRANSACTIONS ON RADIATION AND PLASMA MEDICAL SCIENCES*
Gonzalez-Montoro, A., Gonzalez, A. J., Pourashraf, S., Miyaoka, R. S., Bruyndonckx, P., Chinn, G., Pierce, L. A., Levin, C. S.
2021; 5 (3): 282-305
- **Pseudo CT Image Synthesis and Bone Segmentation From MR Images Using Adversarial Networks With Residual Blocks for MR-Based Attenuation Correction of Brain PET Data** *IEEE TRANSACTIONS ON RADIATION AND PLASMA MEDICAL SCIENCES*
Tao, L., Fisher, J., Anaya, E., Li, X., Levin, C. S.
2021; 5 (2): 193–201
- **Further investigations of a radiation detector based on ionization-induced modulation of optical polarization.** *Physics in medicine and biology*
Wang, Y., Tao, L., Abbaszadeh, S., Levin, C. S.
2021
- **Ionizing photon interactions modulate the optical properties of crystals with femtosecond scale temporal resolution.** *Physics in medicine and biology*
Tao, L. n., Coffee, R. N., Jeong, D. n., Levin, C. S.
2021
- **Noninvasive and Highly Multiplexed Five-Color Tumor Imaging of Multicore Near-Infrared Resonant Surface-Enhanced Raman Nanoparticles In Vivo.** *ACS nano*
Yu, J. H., Steinberg, I., Davis, R. M., Malkovskiy, A. V., Zlitni, A., Radzyminski, R. K., Jung, K. O., Chung, D. T., Curet, L. D., D'Souza, A. L., Chang, E., Rosenberg, J., Campbell, et al
2021
- **Scalable electronic readout design for a 100 ps coincidence time resolution TOF-PET system.** *Physics in medicine and biology*
Pourashraf, S. n., Gonzalez-Montoro, A. n., Won, J. Y., Lee, M. S., Cates, J. W., Zhao, Z. n., Lee, J. S., Levin, C. S.
2021
- **Simulation studies to understand sensitivity and timing characteristics of an optical property modulation-based radiation detection concept for PET.** *Physics in medicine and biology*
Tao, L., Jeong, D., Wang, J., Adams, Z., Bryan, P., Levin, C. S.
2020
- **Motion Correction for Simultaneous PET/MR Brain Imaging Using a Radiofrequency-Penetrable PET Insert.**
Fisher, J., Groll, A., Levin, C.
SOC NUCLEAR MEDICINE INC.2020
- **Deep learning based methods for gamma ray interaction location estimation in monolithic scintillation crystal detectors.** *Physics in medicine and biology*
Tao, L., Li, X., Furenlid, L. R., Levin, C. S.
2020
- **Robust Detector Calibration for a Novel PET System Based on Cross-Strip CZT Detectors** *IEEE TRANSACTIONS ON RADIATION AND PLASMA MEDICAL SCIENCES*
Vernekohl, D., Abbaszadeh, S., Gu, Y., Levin, C. S.
2019; 3 (6): 626–33
- **Fast gamma-ray interaction-position estimation using k-d tree search** *PHYSICS IN MEDICINE AND BIOLOGY*
Li, X., Tao, L., Levin, C. S., Furenlid, L. R.
2019; 64 (15)
- **Electronics method to advance the coincidence time resolution with bismuth germanate.** *Physics in medicine and biology*
Cates, J. W., Levin, C. S.

2019

- **Time Resolution Studies for a 1-mm Resolution Clinical PET System With a Charge Sharing Readout and Leading Edge Discrimination** *IEEE TRANSACTIONS ON RADIATION AND PLASMA MEDICAL SCIENCES*
Hsu, D. C., Freese, D. L., Innes, D. R., Levin, C. S.
2019; 3 (3): 285–91
- **Intercrystal scatter studies for a 1 mm(3) resolution clinical PET system prototype** *PHYSICS IN MEDICINE AND BIOLOGY*
Hsu, D. C., Freese, D. L., Innes, D. R., Levin, C. S.
2019; 64 (9)
- **Intercrystal scatter studies for a 1 mm³ resolution clinical PET system prototype.** *Physics in medicine and biology*
Hsu, D. F., Freese, D. L., Innes, D. R., Levin, C. S.
2019
- **Fast gamma-ray interaction-position estimation using k-d tree search.** *Physics in medicine and biology*
Li, X., Tao, L., Levin, C. S., Furenlid, L. R.
2019
- **Performance evaluation of RF coils integrated with an RF-penetrable PET insert for simultaneous PET/MRI** *MAGNETIC RESONANCE IN MEDICINE*
Lee, B. J., Watkins, R. D., Lee, K., Chang, C., Levin, C. S.
2019; 81 (2): 1434–46
- **Bias Voltage Calibrations for a 1-millimeter Resolution Clinical PET System**
Chin, M., Innes, D., Levin, C. S., IEEE
IEEE.2019
- **Time-resolved Simulation of Optical Modulation from Ionization-induced Fast Charge Carriers**
Jeong, D., Tao, L., Wang, J., Levin, C. S., IEEE
IEEE.2019
- **Investigation of optical property modulation based ionizing radiation detection method for PET: two-crossed-polarizers based method**
Wang, Y., Tao, L., Levin, C. S., Xu, J., IEEE
IEEE.2019
- **Pulse Shape Discrimination and Energy Measurement in Phoswich Detectors Using Gated-Integrator Circuit**
Pourashraf, S., Cates, J. W., Lee, M., Levin, C. S., IEEE
IEEE.2019
- **Study of the Coincidence Time Resolution of New Perovskite Bulk Crystals**
Tao, L., He, Y., Kanatzidis, M. G., Levin, C. S., IEEE
IEEE.2019
- **Search for Ionization-Induced Modulation of Light Polarization for a New Direction to Improve Time Resolution of PET**
Esmaelpour, M., Tao, L., Levin, C. S., IEEE
IEEE.2019
- **High-resolution PET detector with 100 ps coincidence time resolution using side-by-side phoswich design**
Lee, M., Cates, J. W., Levin, C. S., IEEE
IEEE.2019
- **Characterization of TOF-PET detectors for a second generation radiofrequency-penetrable PET insert for simultaneous PET/MRI**
Dong, Q., Lee, B. J., Chang, C., Sacco, I., Watkins, R. D., Fischer, P., Anaya, E., Levin, C. S., IEEE
IEEE.2019
- **Simultaneous Dual Isotope ToF-PET Imaging**
Liu, Z., Lee, M., Chinn, G., Levin, C., IEEE
IEEE.2019
- **Analysis of Data Corrections for the First-Generation Radiofrequency-Penetrable PET Insert for Simultaneous PET/MR**
Groll, A., Levin, C. S., IEEE

IEEE.2019

- **Motion Correction for Simultaneous PET/MR Brain Imaging Using a RF-Penetrable PET Insert**
Fisher, J., Groll, A., Levin, C. S., IEEE
IEEE.2019
- **Approaches to improving the detection sensitivity of optical modulation based radiation detection method for positron emission tomography**
Wang, Y., Tao, L., Levin, C. S., Xu, J., IEEE
IEEE.2019
- **Characterization of a Large Volume Cadmium Zinc Telluride Preclinical PET System**
Groll, A., Levin, C. S., IEEE
IEEE.2019
- **Study of Lutetium-based scintillators for PET system design with 100-ps coincidence time resolution**
Lee, M., Cates, J. W., Kapusta, M., Schmand, M., Levin, C. S., IEEE
IEEE.2019
- **Geometry optimization of electrically floating PET inserts for improved RF penetration for a 3T MRI system** *MEDICAL PHYSICS*
Akram, M., Levin, C. S., Obata, T., Hirumi, G., Yamaya, T.
2018; 45 (10): 4627–41
- **Performance evaluation of RF coils integrated with an RF-penetrable PET insert for simultaneous PET/MRI.** *Magnetic resonance in medicine*
Lee, B. J., Watkins, R. D., Lee, K. S., Chang, C., Levin, C. S.
2018
- **MR Performance in the Presence of a Radio Frequency-Penetrable Positron Emission Tomography (PET) Insert for Simultaneous PET/MRI** *IEEE TRANSACTIONS ON MEDICAL IMAGING*
Lee, B. J., Grant, A. M., Chang, C., Watkins, R. D., Glover, G. H., Levin, C. S.
2018; 37 (9): 2060–69
- **Performance study of a radio-frequency field-penetrable PET insert for simultaneous PET/MRI.** *IEEE transactions on radiation and plasma medical sciences*
Chang, C. M., Lee, B. J., Grant, A. M., Groll, A. N., Levin, C. S.
2018; 2 (5): 422–431
- **Performance Study of a Radio-Frequency Field-Penetrable PET Insert for Simultaneous PET/MRI** *IEEE TRANSACTIONS ON RADIATION AND PLASMA MEDICAL SCIENCES*
Chang, C., Lee, B. J., Grant, A. M., Groll, A. N., Levin, C. S.
2018; 2 (5): 422–31
- **Improved single photon time resolution for analog SiPMs with front end readout that reduces influence of electronic noise.** *Physics in medicine and biology*
Cates, J. W., Gundacker, S., Auffray, E., Lecoq, P., Levin, C. S.
2018
- **Evaluation of a clinical TOF-PET detector design that achieves #100 ps coincidence time resolution.** *Physics in medicine and biology*
Cates, J. W., Levin, C. S.
2018
- **Gray: a ray tracing-based Monte Carlo simulator for PET** *PHYSICS IN MEDICINE AND BIOLOGY*
Freese, D. L., Olcott, P. D., Buss, S. R., Levin, C. S.
2018; 63 (10): 105019
- **Design and Performance of a 1 mm(3) Resolution Clinical PET System Comprising 3-D Position Sensitive Scintillation Detectors** *IEEE TRANSACTIONS ON MEDICAL IMAGING*
Hsu, D. C., Freese, D. L., Reynolds, P. D., Innes, D. R., Levin, C. S.
2018; 37 (4): 1058–66
- **Standard OSEM vs. regularized PET image reconstruction: qualitative and quantitative comparison using phantom data and various clinical radiopharmaceuticals** *AMERICAN JOURNAL OF NUCLEAR MEDICINE AND MOLECULAR IMAGING*
Lantos, J., Mitra, E. S., Levin, C. S., Jagaru, A.

2018; 8 (2): 110–18

- **Ionizing radiation induces femtosecond time scale modulations of a material's optical properties**
Tao, L., Coffee, R., Levin, C. S., Grim, G. P., Furenlid, L. R., Barber, H. B.
SPIE-INT SOC OPTICAL ENGINEERING.2018
- **Positioning true coincidences that undergo inter-and intra-crystal scatter for a sub-mm resolution cadmium zinc telluride-based PET system** *PHYSICS IN MEDICINE AND BIOLOGY*
Abbaszadeh, S., Chinn, G., Levin, C. S.
2018; 63 (2): 025012
- **Clinical evaluation of TOF versus non-TOF on PET artifacts in simultaneous PET/MR: a dual centre experience.** *European journal of nuclear medicine and molecular imaging*
Ter Voert, E. E., Veit-Haibach, P., Ahn, S., Wiesinger, F., Khalighi, M. M., Levin, C. S., Iagaru, A. H., Zaharchuk, G., Huellner, M., Delso, G.
2017; 44 (7): 1223-1233
- **Low eddy current RF shielding enclosure designs for 3T MR applications.** *Magnetic resonance in medicine*
Lee, B. J., Watkins, R. D., Chang, C., Levin, C. S.
2017
- **Studies of a Next Generation Silicon-Photomultiplier-Based Time-of-Flight PET/CT System.** *Journal of nuclear medicine*
Hsu, D. F., Ilan, E., Peterson, W. T., Uribe, J., Lubberink, M., Levin, C. S.
2017
- **Robust Timing Calibration for PET Using L1-Norm Minimization.** *IEEE transactions on medical imaging*
Freese, D., Hsu, D., Innes, D., Levin, C.
2017
- **Time-over-threshold for pulse shape discrimination in a time-of-flight phoswich PET detector** *PHYSICS IN MEDICINE AND BIOLOGY*
Chang, C., Cates, J. W., Levin, C. S.
2017; 62 (1): 258-271
- **New-generation small animal positron emission tomography system for molecular imaging.** *Journal of medical imaging (Bellingham, Wash.)*
Abbaszadeh, S., Levin, C. S.
2017; 4 (1): 011008-?
- **An Expectation Maximization Method for Joint Estimation of Emission Activity Distribution and Photon Attenuation Map in PET** *IEEE TRANSACTIONS ON MEDICAL IMAGING*
Mihlin, A., Levin, C. S.
2017; 36 (1): 214-224
- **Simultaneous PET/MR imaging with a radio frequency-penetrable PET insert.** *Medical physics*
Grant, A. M., Lee, B. J., Chang, C., Levin, C. S.
2017; 44 (1): 112-120
- **Study of material properties important for an optical property modulation-based radiation detection method for positron emission tomography.** *Journal of medical imaging (Bellingham, Wash.)*
Tao, L., Daghighian, H. M., Levin, C. S.
2017; 4 (1): 011010-?
- **Highly multiplexed signal readout for a time-of-flight positron emission tomography detector based on silicon photomultipliers.** *Journal of medical imaging (Bellingham, Wash.)*
Cates, J. W., Bieniosek, M. F., Levin, C. S.
2017; 4 (1): 011012-?
- **A multiplexed TOF and DOI capable PET detector using a binary position sensitive network.** *Physics in medicine and biology*
Bieniosek, M. F., CATES, J. W., Levin, C. S.
2016; 61 (21): 7639-7651
- **A promising new mechanism of ionizing radiation detection for positron emission tomography: modulation of optical properties.** *Physics in medicine and biology*

- Tao, L., Daghighian, H. M., Levin, C. S.
2016; 61 (21): 7600-7622
- **Improvements in PET Image Quality in Time of Flight (TOF) Simultaneous PET/MRI.** *Molecular imaging and biology*
Minamimoto, R., Levin, C., Jamali, M., Holley, D., Barkhodari, A., Zaharchuk, G., Iagaru, A.
2016; 18 (5): 776-781
 - **MR Performance Comparison of a PET/MR System Before and After SiPM-Based Time-of-Flight PET Detector Insertion** *IEEE TRANSACTIONS ON NUCLEAR SCIENCE*
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