

Curriculum vitae

Clemens Spielvogel, PhD

Postdoctoral Research Scientist

Division of Nuclear Medicine

Department of Biomedical Imaging and Image-guided Therapy

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Academic Experience and Milestones

- Since 2023 **Postdoctoral research scientist** (institutionally funded) at the Division of Nuclear Medicine (Dept. for Biomed. Imaging and Image-guided Therapy) at the Medical University of Vienna as independent scientist at the Department of Prof. Marcus Hacker.
- 2019-2023 **Postgraduate doctoral researcher and doctoral studies (PhD)** at the Christian Doppler Laboratory for Applied Metabolomics of Alexander Haug (Dept. for Biomed. Imaging and Image-guided Therapy) and Lukas Kenner (Dept. for Pathology) at the Medical University of Vienna; Thesis title “Molecular disease characterization by application of artificial intelligence in nuclear medicine”, graded 1 (best grade)
- 2019-2022 **Lecturer** at the University of Applied Sciences Technikum Vienna, thesis supervisions and teaching courses related to artificial intelligence, machine learning and computer vision for the Bachelor Program ‘Computer Science’
- 2018-2018 **Scientific machine learning engineer** in the group of Laszlo Papp, PhD (Center for Medical Physics and Biomedical Engineering) at the Medical University of Vienna
- 2016-2018 **Master of Science (MSc)** in Bioinformatics at the University of Applied Sciences Campus Vienna
- 2016-2016 **Scientific Software Consultant** at the University of Graz
- 2013-2016 **Bachelor of Science (BSc)** in Biomedicine and Biotechnology at the University of Veterinary Medicine Vienna

Research Interest and Important Results

Main focus: Clinical applications of artificial intelligence in cardiovascular imaging

Techniques: Machine learning, vision-based deep learning, explainable artificial intelligence, statistical modeling, quantitative imaging markers, imaging / non-imaging data integration, cardiovascular imaging, single photon emission computed tomography (SPECT), positron emission tomography (PET), and computed tomography (CT)

Results: Development and successful multicenter validation of an artificial intelligence-based opportunistic screening approach for cardiac amyloidosis among patients undergoing scintigraphy; Demonstration that machine learning integration of routinely collected multimodal parameters can detect patients with cardiac amyloidosis before conventional diagnosis by clinicians; Discovery of radiogenomic signatures associated with prognosis in patients with head and neck squamous cell carcinoma

Awards

2025	Researcher of the Month of the Medical University of Vienna
2025	General Sponsorship Award for Nuclear Medicine of the Austrian Society for Nuclear Medicine and Theranostics (OGNT)
2024	Dora-Brücke Teleky Award of the Austrian College of Physicians and the Medical University of Vienna Alumni Club
2024	Society of Nuclear Medicine and Molecular Imaging (SNMMI) Young Investigator Award
2024	Society of Nuclear Medicine and Molecular Imaging (SNMMI) 2 nd place Best Clinical Abstract
2024	Best Abstract Award (Digital Cardiology) at the Annual Meeting of the Austrian Society for Cardiology
2024	Carl Apstein Award at the Cardiovascular Research Days
2023	Medical Imaging Cluster Festival Award at the Annual Meeting of the Research Platform Medical Imaging (formerly Medical Imaging Cluster)

Other Achievements

Since 2025	Associate Editor at the European Journal of Nuclear Medicine and Molecular Imaging (EJNMMI) Research
Since 2025	Member of the Austrian Society for Nuclear Medicine's (OGNT) committee for hybrid imaging
Since 2023	Chairing sessions at scientific conferences including the European Nuclear Medicine Association (EANM) conference and the European Molecular Imaging Meeting (EMIM)
Since 2020	Reviewing for various scientific journals e.g. European Heart Journal, npj Digital Medicine, Journal of Nuclear Medicine, Cell Reports Medicine, Med, and Molecular Cancer
2025	Organization, acquisition of sponsoring and lead of the scientific committee of the symposium on "Multimodal Diagnosis of Transthyretin Cardiac Amyloidosis" (Sponsored by Pfizer and Hermes Medical Solutions)
2022-2023	Completion: Stanford University Medical Statistics Professional Program
2021-2022	Completion: IBM-certified Data Science Professional Program
2020, 2025	Co-authoring of the European Nuclear Medicine (EANM) Guide 2020 and 2025

Invited Presentations

2025	European School of Multimodality Imaging & Therapy (ESMIT) Course: Explainable Artificial Intelligence
2025	AttRISE (Stockholm, Sweden): "Artificial Intelligence for Improving the Clinical Management of Patients with Transthyretin Cardiac Amyloidosis"
2025	Austrian Society for Nuclear Medicine and Theranostics (OGNT) Annual Congress (Bad Ischl, Austria): "Artificial Intelligence in Diagnostic Medicine"
2025	Pfizer Symposium at the OGNT Annual Congress (Bad Ischl, Austria): "Challenges and Opportunities for Artificial Intelligence in the Nuclear Medicine-guided Diagnosis of Cardiac Amyloidosis"
2023	Austrian Society of Medical Physicists (OGMP) Annual Congress (Salzburg, Austria): "Artificial Intelligence in Nuclear Medicine"

- 2023 Biomedical Summer School Vienna (Vienna, Austria): “Cardiac Amyloidosis Screening using Artificial Intelligence in Medical Imaging”
- 2021 Postgraduate COMULIS Training School for Radiomics and AI in Molecular Imaging (Vienna, Austria): “Machine Learning Platforms and Model Validation”
- 2019 North German Society of Nuclear Medicine (Hamburg, Germany): “The role of Radiomics in Nuclear Medicine”

Funded Projects

- As sole Principal Investigator:* Contract Agreement: Markers for the detection of cardiac amyloidosis Pfizer 15 000 EUR
- As sole Principal Investigator:* FWF Erwin Schroedinger Fellowship Austrian Science Fund (FWF) Grant: “AI-enabled SPECT/CT imaging for cardiac amyloidosis” 173 380 EUR
- As Sub-Investigator:* Christian Doppler Laboratory (CDL) for Applied Metabolomics Christian Doppler Society 160 000 EUR

Peer-reviewed Publications

First or last authorships are underlined.

Conference papers, conference abstracts and book chapters are not listed.

1. Impact of disease-modifying therapy on [99mTc]Tc-DPD SPECT/CT markers in transthyretin cardiac amyloidosis enabled by artificial intelligence; CP Spielvogel, M Köfler, Z Jiang, J Ning, J Yu, D Haberl, C Kronberger, M Poledniczek, M Schmid, D Kersting, N Ermolaev, R Badr Eslam, M Auer-Grumbach, C Binder, F Duca, C Nitsche, J Kastner, J Bergler-Klein, AA Kammerlander, C Hengstenberg, M Hacker, R Calabretta and R Rettl; European Journal of Nuclear Medicine and Molecular Imaging 2025
2. Feasibility of [68Ga]Ga-FAPI PET Molecular Imaging in Atherosclerosis Compared with [18F]FDG in Oncological Patients; R Calabretta, E Atli, BK Geist, D Muin, L Zisser, CP Spielvogel, C Falkenbach, E Kretschmer-Chott, Stefan Schmitl, J Bergler-Klein, X Li, P Binder and M Hacker; Diagnostics 2025
3. Additive diagnostic value of thoracic SPECT/CT imaging in perugini grade 1 patients who underwent bone scintigraphy; M Poledniczek, Rene Rettl, C Kronberger, M Schmid, N Ermolaev, F Duca, C Nitsche, C Binder, LC Ligios, M Eslami, P Binder, CP Spielvogel, RB Eslam, D Beitzke, J Kastner, J Bergler-Klein, AA Kammerlander, C Hengstenberg, M Hacker and R Calabretta; European Journal of Nuclear Medicine and Molecular Imaging 2025
4. Thyroid hormone receptor beta signaling is a targetable driver of prostate cancer growth; Fesiuk A, D Pölöske, E Araujo, G Frere, TB Wright, G Tin, YS Raouf, OO Olaoye, JS Park, N Blavet, B Tichy, M Schleder, S Högler, M Wolf, C Philippe, O Aksoy, A Varady, A Medaglia-Mata, M Varenicja, B Szabo, T Weiss, G Wasinger, T Redmer, HA Neubauer, M Susani, CP Spielvogel, J Ning, Maik Dahlhoff, M Schepelmann, RD Kennedy, R Moriggl, G Brown, J Persson, C Gerner, V Bystry, O Holloczki, DM Heery, PT Gunning, O Merkel, Brigitte Hantusch and L Kenner; Molecular Cancer 2025
5. A machine learning approach to identify patients at risk for long-term consequences after pulmonary embolism; S Nopp*, CP Spielvogel*, B Bikdeli, A Alberich-Conesa, L Hernandez-Blasco, L Peris, R Otero, D Jimenez, M Monreal, C Ay and the RIETE Investigators; Scientific Reports 2025

6. Impact of Regularization in Optimizing Distance-Encoding Biomorphic-Informational Neural Networks for Small Nuclear Medicine Datasets; B Ecsedi, A Boukhari, **CP Spielvogel**, D Haberl, Z Ritter, RA Bundschuh, C Lapa, M Hacker, M Hatt and L Papp; EANM Innovation 2025
7. Spatial imaging features derived from SUVmax location in resectable NSCLC are associated with tumor aggressiveness; Z Jiang, **CP Spielvogel**, D Haberl, J Yu, M Krisch, S Szakall, P Molnar, J Fillinger, L Horvath, F Renyi-Vamos, C Aigner, B Dome, C Lang, Z Megyesfalvi, L Kenner and M Hacker; European Journal of Nuclear Medicine and Molecular Imaging 2025
8. Using 18F-FDG PET/CT-derived body composition features to predict lymphovascular invasion in non-small cell lung cancer; Z Jiang, D Haberl, **CP Spielvogel**, S Szakall, P Molnar, J Yu, V Lungu, J Fillinger, F Renyi-Vamos, C Aigner, B Dome, C Lang, L Kenner, Z Megyesfalvi and M Hacker; European Journal of Nuclear Medicine and Molecular Imaging 2025
9. Does PARP1 up-regulation correlate with PSMA expression in patients with metastatic castration-resistant prostate cancer studied with [F]PARPi and [Ga]PSMA PET/CT?; H Einspieler*, H Ofner*, M Ozenil, **CP Spielvogel**, IK Langrate, MR Hassler, L Nics, K Bamminger, PAT Baltzer, SF Shariat, M Hacker, G Kramer and S Rasul; European Journal of Nuclear Medicine and Molecular Imaging 2025
10. Comparison of conventional and radiomics-based analysis of myocardial infarction using multimodal non-linear optical microscopy; G Giardina, L Papp, A Krause, J Marchant, N Pallares-Lupon, K Kulkarni, **CP Spielvogel**, D Haberl, X Li, W Drexler, RD Walton, A Unterhuber and M Andreana; Scientific Reports 2025
11. Artificial intelligence-enabled opportunistic identification of immune checkpoint inhibitor-related adverse events using [18F]FDG PET/CT; **CP Spielvogel**, A Lazarevic, L Zisser, D Haberl, C Eseroglou, L Beer, M Hacker and R Calabretta; European Journal of Nuclear Medicine and Molecular Imaging 2025
12. Multimodal Optical Imaging Combined with Radiomic Analysis for Fibrotic Cardiac Tissue Investigation; A Krause, G Giardina, L Papp, D Haberl, **CP Spielvogel**, RD Walton, J Marchant, N Pallares-Lupon, K Kulkarni, X Li, DL Vasquez, J Popp, IW Schie, W Drexler, M Andreana and A Unterhuber; Analytical Chemistry 2025
13. Enhanced vascular inflammation in patients with advanced prostate cancer receiving hormone therapy; H Einspieler*, D Muin*, IK Langrate, S Schmitl, **CP Spielvogel**, BJ Fueger, X Li, G Kramer, SF Shariat, M Hacker and S Rasul; European Journal of Nuclear Medicine and Molecular Imaging 2025
14. Enhancing Blood–Brain Barrier Penetration Prediction by Machine Learning-Based Integration of Novel and Existing, In Silico and Experimental Molecular Parameters from a Standardized Database; **CP Spielvogel***, N Schindler*, C Schröder, SL Stellnberger, W Wadsak, M Mitterhauser, L Papp, V Pichler and C Vraha; Journal of Chemical Information and Modeling 2025
15. Clinician-driven automated data preprocessing in nuclear medicine AI environments; D Krajnc, **CP Spielvogel**, B Ecsedi, Z Ritter, H Alizadeh, M Hacker and L Papp; European Journal of Nuclear Medicine and Molecular Imaging 2025
16. Enhanced diagnostic and prognostic assessment of cardiac amyloidosis using combined 11C-PIB PET/CT and 99mTc-DPD scintigraph; H Zhihui*, **CP Spielvogel***, S Xue, R Calabretta, Z Jiang, J Yu, K Kluge, D Haberl, C Nitsche, S Grünert, M Hacker and X Li; European Journal of Nuclear Medicine and Molecular Imaging 2025
17. Imaging and outcome correlates of ctDNA methylation markers in prostate cancer: a comparative, cross-sectional [68Ga]Ga-PSMA-11 PET/CT study; K Kluge, V Lotz, H Einspieler, D Haberl, **CP Spielvogel**, D 2025

- Amereller, G Kramer, B Grubmüller, S Shariat, AR Haug, M Hacker, L Kenner and G Egger; Clinical Epigenetics
18. Generative artificial intelligence enables medical image generation and improves generalization of machine learning models in data-constrained environments; D Haberl, J Ning, K Kluge, K Kumpf, J Yu, Z Jiang, CS Constantino, A Monaci, M Starace, AR Haug, R Calabretta, L Camoni, F Bertagna, K Mascherbauer, F Hofer, D Albano, R Sciagra, FPM Oliveira, D Costa, C Nitsche, M Hacker and **CP Spielvogel**; European Journal of Nuclear Medicine and Molecular Imaging 2025
 19. Preoperative detection of extraprostatic tumor extension in patients with primary prostate cancer utilizing [68Ga]Ga-PSMA-11 PET/MRI; **CP Spielvogel***, J Ning*, K Kluge, D Haberl, G Wasinger, J Yu, H Einspieler, L Papp, B Grubmüller, SF Shariat, PAT Baltzer, P Clauser, M Hartenbach, L Kenner, M Hacker, AR Haug* and S Rasul*; Insights into Imaging 2024
 20. Systemic Metabolic and Volumetric Assessment via Whole-Body [¹⁸F]FDG-PET/CT: Pancreas Size Predicts Cachexia in Head and Neck Squamous Cell Carcinoma; J Yu, **CP Spielvogel**, D Haberl, Z Jiang, Ö Özer, S Pusitz, B Geist, M Beyerlein, I Tibu, E Yildiz, SA Kandathil, T Buschhorn, J Schnoell, K Kumpf, YT Chen, T Wu, Z Zhang, M Hacker and C Vraka; Cancers 2024
 21. Diagnosis and prognosis of abnormal cardiac scintigraphy uptake at risk for cardiac amyloidosis using artificial intelligence: An international, multi-center, cross-tracer development and validation study; **CP Spielvogel***, D Haberl*, K Mascherbauer, J Ning, K Kluge, T Traub-Weidinger, RH Davies, I Pierce, K Patel, T Nakuz, A Göllner, D Amereller, M Starace, A Monaci, M Weber, X Li, AR Haug, R Calabretta, X Ma, M Zhao, J Mascherbauer, A Kammerlander, C Hengstenberg, LJ Menezes, R Sciagra, TA Treibel, M Hacker and C Nitsche; The Lancet Digital Health 2024
 22. A novel assessment of whole-mount Gleason grading in prostate cancer to identify candidates for radical prostatectomy: a machine learning-based multiomics study; J Ning*, **CP Spielvogel***, D Haberl, K Trachtova, S Stoiber, S Rasul, V Bystry, G Wasinger, P Baltzer, E Gurbhofer, G Timelthaler, M Schleder, L Papp, H Schachner, T Helbuch, M Hartenbach, B Grubmüller, SF Shariat, M Hacker, A Haug and L Kenner; Theranostics 2024
 23. Multicenter PET Image Harmonization using Generative Adversarial Networks; D Haberl, **CP Spielvogel**, Z Jiang, F Orhac, D Iommi, I Carrio, I Buvat, A Haug, and L Papp; European Journal of Nuclear Medicine and Molecular Imaging 2024
 24. Comparison of discovery rates and prognostic utility of [68Ga]Ga-PSMA-11 PET/CT and circulating tumor DNA in prostate cancer - a cross-sectional study; K Kluge, H Einspieler, D Haberl, **CP Spielvogel**, D Amereller, G Egger, G Kramer, B Grubmüller, S Shariat, M Hacker, L Kenner and A Haug. European Journal of Nuclear Medicine and Molecular Imaging 2024
 25. Examining the Relationship and Prognostic Significance of Cell-Free DNA Levels and the PSMA-Positive Tumor Volume in Men with Prostate Cancer: A Retrospective-Prospective [68Ga]Ga-PSMA-11 PET/CT Study; K Kluge, H Einspieler, D Haberl, **CP Spielvogel**, S Stoiber, C Vraka, L Papp, S Wunsch, G Egger, G Kramer, B Grubmüller, S Shariat, M Hacker, L Kenner and A Haug; Journal of Nuclear Medicine 2024
 26. Assessment of PSMA expression of healthy organs in different stages of prostate cancer using [68Ga]Ga-PSMA-11-PET examinations; H Einspieler, K Kluge, D Haberl, K Schatz, L Nics, S Schmitl, B K Geist, **CP Spielvogel**, B Grubmüller, PAT Baltzer, G Kramer, SF Shariat, M Hacker, and S Rasul. Cancers 2023

27. Mitochondrial polymorphism m3017C>T of SHLP6 relates to heterothermy; S V Emser, **CP Spielvogel**, E Millesi, R Steinborn; *Frontiers in Physiology* 2023
28. Error mitigation enables PET radiomic cancer characterization on quantum computers; S Moradi, **CP Spielvogel**, D Krajnc, C Brandner, S Hillmich, R Wille, T Traub-Weidinger, X Li, M Hacker, W Drexler, L Papp; *European Journal of Nuclear Medicine and Molecular Imaging* 2023
29. DEBI-NN: Distance-encoding biomorphic-informational neural networks for minimizing the number of trainable parameters; L Papp, D Haberl, B Ecsedi, **CP Spielvogel**, D Krajnc, M Grahovac, S Moradi, Wolfgang Drexler; *Neural Networks* 2023
30. Machine learning predictive performance evaluation of conventional and fuzzy radiomics in clinical cancer imaging cohorts; M Grahovac, **CP Spielvogel** D Krajnc, B Ecsedi, T Traub-Weidinger, S Rasul, K Kluge, M Zhao, X Li, M Hacker, A Haug and L Papp; *European Journal of Nuclear Medicine and Molecular Imaging* 2023
31. Sex-specific radiomic features of L-[S-methyl-11C] methionine PET in patients with newly-diagnosed gliomas in relation to IDH1 predictability; L Papp, S Rasul, **CP Spielvogel**, D Krajnc, N Poetsch, A Woehrer, EM Patronas, B Ecsedi, J Furtner, M Mitterhauser, IF Rausch, G Widhalm, T Beyer, M Hacker and T Traub-Weidinger; *Frontiers in Oncology* 2022
32. Radiogenomic markers enable risk stratification and inference of mutational pathway states in head and neck cancer; **CP Spielvogel**, S Stoiber, L Papp, D Krajnc, M Grahovac, E Gurnhofer, K Trachtova, V Bystry, A Leisser, B Jank, J Schnoell, L Kadletz, G Heiduschka, T Beyer, M Hacker, L Kenner* and A R Haug*; *European Journal of Nuclear Medicine and Molecular Imaging* 2022
33. Automated data preparation for in vivo tumor characterization with machine learning; D Krajnc, **CP Spielvogel**, M Grahovac, B Ecsedi, S Rasul, N Poetsch, T Traub-Weidinger, AR Haug, Z Ritter, H Alizadeh, M Hacker, T Beyer, and L Papp; *Frontiers in Oncology* 2022
34. Multi-lesion radiomics of PET/CT for non-invasive survival stratification and histologic tumor risk profiling in patients with lung adenocarcinoma; M Zhao, K Kluge, L Papp, M Grahovac, S Yang, C Jiang, D Krajnc, **CP Spielvogel**, B Ecsedi, A Haug, S Wang, M Hacker, W Zhang, and X Li; *European Radiology* 2022
35. Clinical data classification with noisy intermediate scale quantum computers; S Moradi, C Brandner, **CP Spielvogel**, D Krajnc, S Hillmich, R Wille, W Drexler and L Papp; *Scientific Reports* 2022
36. Bleeding risk assessment in end-stage kidney disease: validation of existing risk scores and evaluation of a machine learning-based approach; S Nopp, **CP Spielvogel**, S Schmaldienst, R Klauser-Braun, M Lorenz, B Bauer, I Pabinger MD Saemann, O Königsbrügge, and C Ay; *Thrombosis and Haemostasis* 2021
37. Toward Quantitative in vivo Label-Free Tracking of Lipid Distribution in a Zebrafish Cancer Model; M Andreana, C Sturtzel, **CP Spielvogel**, L Papp, R Leitgeb, W Drexler, M Distel and A Unterhuber; *Frontiers in Cell and Developmental Biology* 2021
38. Morpho-Molecular Metabolic Analysis and Classification of Human Pituitary Gland and Adenoma Biopsies Based on Multimodal Optical Imaging; G Giardina, A Micko, D Bovenkamp, A Krause, F Placzek, L Papp, D Krajnc, **CP Spielvogel**, M Winklehner, Romana Höftberger, F Vila, M Adreana, R Leitgeb, W Drexler, S Wolfsberger and A Unterhuber; *Cancers* 2021
39. Supervised machine learning enables non-invasive lesion characterization in primary prostate cancer with [Ga]Ga-PSMA-11 PET/MRI; L Papp, **CP Spielvogel**, B Grubmüller, M Grahovac, D Krajnc, B Ecsedi, R AM Saresghi, D Mohamad, M Hamboeck, I Rausch, M Mitterhauser, W Wadsak, A R Haug, L Kenner, P Mazal, M 2021

Susani, S Hartenbach, P Baltzer, TH Helbich, G Kramer, SF Shariat, T Beyer, M Hartenbach and M Hacker; European Journal of Nuclear Medicine and Molecular Imaging

40. Breast Tumor Characterization Using [18F]FDG-PET/CT Imaging Combined with Data Preprocessing and Radiomics; D Krajnc, L Papp, T S Nakuz, H F Magometschnigg, M Grahovac, **CP Spielvogel**, B Ecsedi, Z Bago-Horvath, A Haug, G Karanikas, T Beyer, M Hacker, TH Helbich and K Pinker; Cancers 2021
41. Transcription factors CP2 and YY1 as prognostic markers in head and neck squamous cell carcinoma: analysis of The Cancer Genome Atlas and a second independent cohort; J Schnoell, B J Jank, L Kadletz-Wanke, S Stoiber, **CP Spielvogel**, E Gurnhofer, L Kenner and G Heiduschka; Journal of Cancer Research and Clinical Oncology 2021
42. Personalizing Medicine Through Hybrid Imaging and Medical Big Data Analysis; L Papp, **CP Spielvogel**, I Rausch, M Hacker and T Beyer; Frontiers in Physics 2018