

Team Activity Report – 2023 (Period: 01.01 - 31.12)

Deadline: January 29th, 2024

Unit	U1288
Team	Laboratory of Translational Imaging in Oncology (LITO)
Team leader	Irène Buvat
Title (Pr or Dr)	DRCE1 CNRS
Label (ex: Ligue, Labex, ATIP-Avenir,...)	n/a
Researcher unique identifier(s) (such as ORCID, Research ID, etc.)	ORCID: 0000-0002-7053-6471
SCIENTIFIC PRODUCTION	
List of Publications indicating -Impact factor (IF) if known -DOI	1. Hovhannisyan-Baghdasarian N, Luporsi M, Captier N, Nioche C, Cuplov V, Woff E, Hegarat N, Livartowski A, Girard N, Buvat I, Orlhac F. New promising candidate prognostic biomarkers in [18F]FDG-PET images: evaluation in independent cohorts of NSCLC patients. J Nucl Med, in press, 2024. IF=9.3 2. Kocak B, Akinci D'Antonoli T, Mercaldo N, Alberich-Bavarrri A, Baessler B, Ambrosini I, Andreychenko A, Bakas S, Beets-Tan R, Bressen K, Buvat I, Cannella R, Cappellini LA, Cavallo AU, Chepelev LL, Chu LCH, Demircioglu A, deSouza NM, Dietzel M, Fanni SC, Fedorov A, Fournier LS, Giannini V, Girometti R, Groot Lipman KBW, Kalarakis G, Kelly B, Klontas ME, Koh DM, Kotter E, Lee HY, Maas M, Marti-Bonmati L, Müller H, Obuchowski N, Orlhac F, Papanikolaou N, Petrash E, Pfaehler E, Pinto dos Santos D, Ponsiglione A, Sabater S, Sardanelli F, Seeböck P, Sijtema NM, Stanzione A, Traverso A, Ugga L, Vallières M, van Dijk LV, van Griethuysen JJM, van Hamersvelt RW, van Ooijen P, Vernuccio F, Wang A, Williams S, Witowski J, Zhang Z, Zwanenburg A, Cuocolo R. METHodological Radiomics Score (METRICS): a quality scoring tool for radiomics research endorsed by EusoMII. Insights into Imaging, 15:8, 2024. DOI: https://doi.org/10.1186/s13244-023-01572-w IF=4.7 3. Cottreau AS, Rebaud L, Trotman J, Feugier P, Nastoupil LJ, Bachy E, Flinn IW, Haioun C, Ysebaert L, Bartlett NL, Tilly H, Casasnovas O, Ricci R, Portugues C, Buvat I, Meignan M, Morschhauser F. Metabolic tumor volume predicts outcome in advanced stage follicular lymphoma patients from the Relevance trial. Ann Oncol, 35:130-137, 2024. DOI: https://doi.org/10.1016/j.annonc.2023.10.121 IF=50.5 4. Mahé M, Beddok A, Goudjil F, Ala Eddine C, Bolle S, Champion L, Feuvret L, Herman P, Zefkili S, Choussy O, Le Tourneau C, Dendale R, Buvat I, Sauvaget E, Créhanche G, Calugaru V. Curative high-dose reirradiation for patients with recurrent head and neck adenoid cystic carcinomas: outcomes and analysis of patterns of failure. Int J Radiat Biol, 100:79-86, 2024. DOI: 10.1080/09553002.2023.2242934. IF=2.6 5. Fraioli F, Albert A, Boellaard R, Boscolo Galazzo I, Brendel M, Buvat I, Castellaro M, Cecchin D, Fernandez PA, Guedj E, Hammers A, Kaplar Z, Morbelli S, Papp L, Shi K, Tolboom N, Traub-Weidinger T, Verger A, Van Weehaeghe D, Yakushev I, Barthel M. Application of Artificial Intelligence (AI) in molecular brain imaging: Perspectives from the Neuroimaging committee of the EANM. Eur J Nucl Med Mol Imaging, in press, 2023. IF=9.1 6. Girum KB, Cottreau AS, Vercellino L, Rebaud L, Clerc J, Casasnovas O, Morschhauser F, Thieblemont C, Buvat I. Tumor location relative to the spleen is

- a prognostic factor in lymphoma patients: a demonstration from the REMARC trial. *J Nucl Med*, in press, 2023. IF=9.3
7. Camoni L, Santos A, **Luporsi M**, Grilo A, Pietrzak A, Gear J, Zucchetta P, Bar-Sever Z. EANM procedural recommendations for managing the paediatric patient in diagnostic nuclear medicine. *Eur J Nucl Med Mol Imaging*, 50:3862-3879, 2023. DOI: doi: 10.1007/s00259-023-06357-3 IF=9.1
 8. **Beddok A**, Mouren V, Cottu P, Laki F, Fourquet A, Kirova Y. Outcomes and toxicity of concurrent CDK4/6 inhibitor and locoregional radiotherapy for patients with de novo metastatic breast cancer. *Int J Cancer*. 153(7):1386-1396, 2023. DOI: 10.1002/ijc.34562. IF=6.4
 9. **Beddok A**, Chabi-Charvillat ML, Kennel T, de Wolf J, Pricopi C, Crequit P, Girard N, Otz J, Vallée A, Longchamp E, Sage E, Glorion M. Prospective Radiologic-Pathologic Correlation of Macroscopic Volume and Microscopic Extension of Nonsolid Lung Nodules on Thin-section CT Images for Sublobar Resection and Stereotactic Radiotherapy Planning. *Clin Lung Cancer*. 24(2):98-106, 2023. DOI: 10.1016/j.clcc.2022.11.001 IF=3.6
 10. Schneider T, **Malaise D**, **Pouzoulet F**, Prezado Y. Orthovoltage X-ray Minibeam Radiation Therapy for the Treatment of Ocular Tumours-An In Silico Evaluation. *Cancers* (Basel). 15(3):679, 2023. DOI: 10.3390/cancers15030679 IF=5.2
 11. **Beddok A**, Scher N, Alapetite C, Baussart B, Bentahila G, Bielle F, Bolle S, Dendale R, Dureau S, Goudjl F, Helfre S, **Mammar H**, Nichelli L, Calugaru V, Feuvret L. Proton therapy for adult craniopharyngioma: Experience of a single institution in 91 consecutive patients. *Neuro Oncol*. 25(4):710-719, 2023. DOI: 10.1093/neuonc/noac210. IF=15.9
 12. Deut U, **Ronga MG**, Bonfrate A, **De Marzi L**. Secondary radiation dose modeling in passive scattering and pencil beam scanning very high energy electron (VHEE) radiation therapy. *Med Phys*, 50(7):4491–4504, 2023. DOI: <https://doi.org/10.1002/mp.16443> IF=3.8
 13. **Ronga MG**, Deut U, Bonfrate A, **De Marzi L**. Very high-energy electron dose calculation using multiple scattering theory and a simplified pencil beam model. *Med Phys*, 1-14, 2023. DOI: <https://doi.org/10.1002/mp.16697> IF=3.8
 14. Flynn S, Allport P, **De Marzi L**, Green S, Homer M, Lee N, Ortiz R, Patriarca A, Prezado Y, Thomas R, Price T. Development of CMOS dosimetry in proton minibeam for enhanced QA and primary standard absorbed dose calorimetry. *JINST*, 8: P03014, 2023. DOI: <https://doi.org/10.1088/1748-0221/18/03/P03014> IF=1.3
 15. Leite AMM, Bonfrate A, Da Fonseca A, Lansonneur P, Alapetite C, **Mammar H**, **De Marzi L**. Double scattering and pencil beam scanning Monte Carlo workflows for proton therapy retrospective studies on radiation-induced toxicities. *Cancer Radiother*, S1278-3218(23)00070-7, 2023. DOI: <https://doi.org/10.1016/j.canrad.2023.02.001> IF=1.3
 16. Loap P, Barcellini A, **De Marzi L**, Orlandi E, Kirova Y. Neutron brachytherapy in the modern era: Indications and evidence. *Cancer Radiother*, 27(2):170–177, 2023. DOI: <https://doi.org/10.1016/j.canrad.2022.08.010> IF=1.3
 17. Whybra P, Zwanenburg A, Andrearczyk V, Schaer R, Apte AP, Ayotte A, Baheti B, Bakas S, Bettinelli A, Boellaard R, Boldrini L, **Buvat I**, Cook GJR, Dietsche F, Dinapoli N, Gabryś HS, Goh V, Guckenberger M, Hatt M, Hosseinzadeh M, Iyer A, Lenkowicz J, Loutfi MAL, Löck A, Marturano A, Morin O, **Nioche C**, **Orlhac F**, Pati S, Rahmim A, Rezaeijoo SM, Rookyard CG, Salmanpour MR, Schindele A, Shiri I, Spezi E, Tanadini-Lang S, Tixier F, Upadhaya T, Valentini V, van Griethuysen JJM, Yousefirizi F, Zaidi H, Müller H, Vallières M, Depeursinge A. The Image Biomarker Standardization Initiative: Standardized Convolutional Filters for

	Reproducible Radiomics and Enhanced Clinical Insights. Radiology, in press, 2023. IF=19.7 18. Seban RD, Arnaud E, Loirat D, Cabel L, Cottu P, Djerroudi L, Hescot A, Loap P, Bonneau C, Bidard FC, Huchet V, Jehanno N, Berenbaum A, Champion L, Buvat I. [18F]FDG PET/CT for predicting triple-negative breast cancer outcomes after neoadjuvant chemotherapy with or without pembrolizumab. Eur J Nucl Med Mol Imaging, 50:4024-4035, 2023. IF=9.1 19. Malhaire C, Selhane F, Saint-Martin MJ, Cockenpot V, Akl P, Laas E, Bellesoeur A, Ala-Eddine C, Bereby-Kahane M, Manceau J, Sebbag-Sfez D, Pierga JY, Reyat F, Vincent-Salomon A, Brisse H, Frouin F. Exploring the added value of pretherapeutic MR descriptors in predicting breast cancer pathologic complete response to neoadjuvant chemotherapy. Eur Radiol, 33:8142-8154, 2023. IF=5.9 20. Beddok A, Maynadier X, Krhili S, Ala Eddine C, Champion L, Chilles A, Goudjil F, Zefkili S, Amessis M, Choussy O, Le Tourneau C, Buvat I, Créhange G, Carton M, Calugaru V. Predictors of toxicity after curative reirradiation with intensity modulated radiotherapy or proton therapy for recurrent head and neck carcinoma: new dose constraints for pharyngeal constrictors muscles and oral cavity. Strahlenther Onkol, 199:901-909, 2023. IF=3.1 21. Kocak B, Baessler B, Bakas S, Cuocolo R, Fedorov A, Maier-Hein L, Mercaldo N, Müller H, Orlhac F, Pinto dos Santos D, Stanzione A, Ugga L, Zwanenburg A. CheckList for EvaluAtion of Radiomics research (CLEAR): a step-by-step reporting guideline for authors and reviewers. <i>Insights into Imaging</i>, 14(1):75, 2023. DOI: 10.1186/s13244-023-01415-8 IF=4.7 22. Buvat I, Weber W. Nuclear Medicine from a Novel Perspective: Buvat and Weber Talk with OpenAI's ChatGPT. J Nucl Med. 64:505-507, 2023. DOI: 10.2967/jnumed.123.265636 IF=9.3 23. Khalid F, Goya-Outi J, Escobar T, Dangouloff-Ros V, Grigis A, Philippe C, Boddaert N, Grill J, Frouin V, Frouin F. Multimodal MRI radiomic models to predict genomic mutations in diffuse intrinsic pontine glioma with missing imaging modalitie. Front Med, 10:1071447, 2023, DOI: 10.3389/fmed.2023.1071447. IF=3.9 24. Nanni C, Kobe C, Baessler B, Baues C, Boellaard R, Borchmann P, Buck A, Buvat I, Chapuy B, Cheson B, Chrzan R, Cottreau AS, Dührsen U, Eikenes L, Hutchings M, Jurczak W, Kraeber-Bodéré F, Kopci E, Luminari S, MacLennan S, Mikhaeel G, Nijland M, Rodriguez-Otero P, Treglia G, Withofs N, Zamagni E, Zinzani PL, Zijlstra JM, Herrmann K, Kunikowska J. EANM Focus 4: Consensus on molecular imaging and therapy in haematological tumors. Lancet Haematol, 10(5):e367-e381, 2023. DOI: 10.1016/S2352-3026(23)00030-3. IF=24.7 25. Saboury B, Bradshaw T, Boellaard R, Buvat I, Dutta J, Hatt M, Jha AK, Li Q, Liu C, McMeekin H, Morris MA, Scott PJH, Siegel E, Sunderland JJ, Wahl RL, Zuehlsdorff S, Rahmim A. Toward Trustworthy Artificial Intelligence Ecosystems: Opportunities, Challenges, and Responsibilities in Nuclear Medicine. J Nucl Med, 64:188-196, 2023. DOI: 10.2967/jnumed.121.263703. IF=9.3 26. Rahimpour M, Saint Martin MJ, Frouin F, Akl P, Orlhac F, Koole M, Malhaire C. Visual ensemble selection of deep convolutional neural networks for 3D segmentation of breast tumors on dynamic contrast enhanced MRI. Eur Radiol, 33(2):959-969, 2023. DOI: 10.1007/s00330-022-09113-7 IF=5.9 27. Rebaud L, Escobar T, Khalid F, Girum K, Buvat I. Simplicity Is All You Need: Out-of-the-Box nnUNet Followed by Binary-Weighted Radiomic Model for Segmentation and Outcome Prediction in Head and Neck PET/CT. In: Andrearczyk, V., Oreiller, V., Hatt, M., Depeursinge, A. (eds) Head and Neck Tumor Segmentation and Outcome Prediction. HECKTOR 2022. Lecture Notes in Computer Science, vol 13626. Springer, 2023. DOI: https://doi.org/10.1007/978-3-031-27420-6_13
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	28. Beddok A, Orlhac F, Calugaru V, Champion L, Ala Eddine C, Nioche C, Crehange G, Buvat I. [18F]-FDG PET and MRI radiomic signatures to predict the risk and the location of tumor recurrence after re-irradiation in head and neck cancer. Eur J Nucl Med Mol Imaging, 50(2):559-571, 2023. DOI: 10.1007/s00259-022-06000-7 IF=9.1 29. Ortiz R, Belshi R, De Marzi L, Prezado Y. Proton minibeam radiation therapy for treating metastases: a treatment plan study. Med Phys, 10.1002/mp.16203, 2023. DOI: 10.1002/mp.16203 IF=3.8 30. Leite AMM, Cavallone M, Ronga MG, Tromprier F, Patriarca A, De Marzi L. Ion recombination correction factors and benchmark of detectors in a very-high dose rate proton scanning beam. Phys Med, 106:102518, 2023. DOI: https://doi.org/10.1016/j.ejmp.2022.102518 IF=3.4 31. Iturri L, Bertho A, Lamirault C, Juchaux M, Gilbert C, Espenon J, Sebie C, Jordain L, Pouzoulet F, Verrelle P, de Marzi L, Prezado Y. Proton flash therapy and immune infiltration: evaluation in an orthotopic glioma rat model. Int J Rad Oncol Biol Physics, 116:655-665, 2023. DOI: https://doi.org/10.1016/j.ijrobp.2022.12.018 IF=2.6 32. Guardiola C, Bachiller-Perea D, Kole EMM, Fleta C, Quirion D, De Marzi L, Gómez F. First experimental measurements of 2D microdosimetry maps in proton therapy. Med Phys. 50(1):570-581, 2023. DOI: 10.1002/mp.15945 IF=3.8 33. Prendergast CM, Lopci E, Seban RD, De Jong D, Ammari S, Aneja S, Lévy A, Sajan A, Salvatore MM, Cappacione KM, Schwartz LH, Deutsch E, Dercle L. Integrating [18F]-Fluorodeoxyglucose Positron Emission Tomography with Computed Tomography with Radiation Therapy and Immunomodulation in Precision Therapy for Solid Tumors. <i>Cancers (Basel)</i>. 15(21):5179, 2023. doi: 10.3390/cancers15215179. IF=5.2 34. McGale J, Khurana S, Huang A, Roa T, Yeh R, Shirini D, Doshi P, Nakhla A, Bebawy M, Khalil D, Lotfalla A, Higgins H, Gulati A, Girard A, Bidard FC, Champion L, Duong P, Dercle L, Seban RD. PET/CT and SPECT/CT Imaging of HER2-Positive Breast Cancer. <i>J Clin Med</i>. 12(15):4882, 2023. doi: 10.3390/jcm12154882. IF=3.9 35. Khalil D, Lotfalla A, Girard A, Ha R, Dercle L, Seban RD. Advances in PET/CT Imaging for Breast Cancer Patients and Beyond. <i>J Clin Med</i>. 12(2):651, 2023. doi: 10.3390/jcm12020651. IF=3.9 36. Grambow-Velilla J, Seban RD, Chouahnia K, Assié JB, Champion L, Girard N, Bonardel G, Matton L, Soussan M, Chouaïd C, Duchemann B. Total Metabolic Tumor Volume on 18F-FDG PET/CT Is a Useful Prognostic Biomarker for Patients with Extensive Small-Cell Lung Cancer Undergoing First-Line Chemo-Immunotherapy. <i>Cancers (Basel)</i>. 15(8):2223, 2023. doi: 10.3390/cancers15082223. IF=5.2 37. Malhaire C. Radiomics in 18F-FDG PET/CT predicts HER2 status in breast cancer with equivocal immunohistochemistry. <i>Eur J Rad</i> 2023:111238, 2023. doi: 10.1016/j.ejrad.2023.111238 IF= 3.3
H factor for team leader and average citation index, indicating source (Webscience, etc.)	Irène Buvat H-index Web of Science Core Collection = 47 Average citation index (articles only, abstracts excluded) Web of science = 67.4 H-index google scholar = 53 Total number of citations google scholar = 19992, Web of Science = 12415
List of Patents -Title -Reference N° -Date	- Method for determining the influence of a plurality of regions of a medical image on a prediction model (Captier N, Buvat I, application EP23176864.9, 2023)

-List of people involved	
List of scientific highlights in 2023 (Publication or other) - 5 max.	1. A patented prognostic radiomic biomarker reflecting disease dissemination that we published in 2020 (Cottureau et al, J Nucl Med 2020 and Ann Oncol 2021) has now been validated by several independent teams worldwide in more than 2,000 patients (Albano et al, Cancers 2023). 2. Development and validation of powerful 18F-FDG PET prognostic biomarkers and radiomic models for NSCLC patients treated with immunotherapy ± chemotherapy and demonstration of the relevance of multi-omic approaches for accurate predictions (Hovhannisyan, J Nucl Med 2024, Comte et al submitted, Captier et al submitted). 3. Development at Institut Curie and external validation at MGH Boston of a 18F-FDG PET radiomic signature to predict tumor recurrence after re-irradiation in patients with head and neck cancer (Beddok et al, Eur J Nucl Med Mol Imaging 2023, J Nucl Med submitted). 4. Participation in the publication of new guidelines for enhanced radiomic feature calculations and radiomic studies established through international collaborations (Whybra et al, Radiology 2023, Kocak et al, Insights Imaging 2023 x 2). 5. Participation in a new project, BIDIFLY, focusing on the multi-omic characterization of follicular lymphoma and on the design of stratification models led by Dr Clémentine Sarkozy and funded by IFLI (https://i-fli.org, 7 M€).
Other written productions of the team (e.g.: book chapter, etc.) - 5 max.	n/a
List of software developed -Name -Version -Release date	1. LIFEx: https://lifexsoft.org/index.php/product/overview-of-versions One official release in 2023: 7.4.0 (23/6/2023). More than 7500 users in the world end of 2023. 2. ROBI: Robust and Optimized Biomarker Identifier. Louis Rebaud. https://github.com/Lrebaud/robi, Apache License 2.0. 09/2023. 3. RadShap: A radiomic interpretation tool based on Shapley values https://github.com/ncaptier/radshap Custom open source licence. 09/2023.
List of startup -Name -Date of creation -Team members	n/a
ORGANIZATION OF SCIENTIFIC MEETINGS - INSTITUTIONAL RESPONSABILITIES	
List of invitations to meetings and seminars (in France or international) -Meeting title -Date -Place -Presentation title -Authors	1. European Congress of Radiology, 4 March 2023, Vienna, Austria. Hybrid imaging radiomics, I Buvat. 2. International conference on laser, optics and photonics, 27-28 march 2023, Paris. Enhanced Efficacy of PDT When Combined with Nitroglycerin Ointment Administration on Xenografted Retinoblastoma in Mice". C Thomas. 3. Nordic Association for Clinical Physics conference, 1 April 2023, Reykjavik, Island. Artificial Intelligence in Imaging and Therapy, I Buvat. 4. Pharma colloquium 4th edition, 24 april 2023 (online). Enhanced Efficacy of PDT When Combined with Nitroglycerin Ointment Administration on Xenografted Retinoblastoma in Mice". C Thomas.

	5. Société Française de Chirurgie Thoracique et Chirurgie Vasculaire, 27 avril 2023, virtuel. Radiomique et Intelligence Artificielle en imagerie TEP pour la prise en charge des cancers pulmonaires. F Orlhac. 6. 6th International Caparica Conference on Ultrasonic-based applications from analysis to synthesis, 26 June 2023, Lisbon. The VOCALISE project: a non-invasive longitudinal analysis of vocal fold function based on simultaneous translaryngeal ultrasound and voice acquisitions, F Frouin. 7. Paris Santé Campus seminar, 12 May 2023, Paris. A quest for new biomarkers and therapeutic targets in cancer patients using local and whole-body radiomics in molecular imaging, I Buvat. 8. Congrès annuel Société d’Imagerie de la Femme, 2 Juin 2023, Bordeaux. Séquences rapides en IRM: Incontournables ? C Malhaire. 9. Society of Nuclear Medicine and Molecular Imaging annual meeting 2023, 26 June 2023, Chicago, US. Should deep learning replace radiomics? Public debate with Tyler Bradshaw, Joyita Dutta, and Abhinav Jha, I Buvat. 10. 20th biennial South Africa Society of Nuclear Medicine congress, 26 august 2023, on-line. Artificial Intelligence in Nuclear Medicine, I Buvat. 11. 20th biennial South Africa Society of Nuclear Medicine congress, 26 august 2023, on-line. Capacitating women: who, when, and how? I Buvat. 12. Department of Translational Imaging seminar, Institut Curie, 4 september 2023, Paris. A quest for actionable prognostic and predictive radiomic biomarkers in molecular imaging: the case of lymphoma. I Buvat. 13. 1ère Journée d’imagerie du cancer du sein de l’Institut Curie, Institut Curie, Paris, 1 september 2023. Médecine nucléaire dans le cancer du sein : Nouveaux traceurs et perspectives ? RD Seban. 14. Cancer World Conference, 12 september 2023, Miami & online. Enhanced Efficacy of PDT When Combined with Nitroglycerin Ointment Administration on Xenografted Retinoblastoma in Mice”. C Thomas. 15. Assemblée Générale de la 6ème chambre de la Cour des Comptes, 14 septembre 2023, Paris. Intelligence artificielle en imagerie médicale. I Buvat. 16. Society of Nuclear Medicine and Molecular Imaging - Physics, Instrumentation and Data Science seminar, 28 september 2023, on-line. From literature studies to AI in Nuclear Medicine: lessons learned from an exciting journey in academia. I Buvat. 17. 9th international workshop on PET in lymphoma and myeloma, 7 october 2023, Menton, France. How to calculate and best combine new relevant radiomic biomarkers for lymphoma patients. I Buvat. 18. The International Networking Symposium on Artificial Intelligence and Informatics in Nuclear Medicine, 9 october 2023, Gröningen, The Netherlands. Potential applications for ChatGPT in Nuclear Medicine. I Buvat. 19. Journées Françaises de Radiologie, 13 Octobre 2023, Paris. IRM préthérapeutique pour l'aide à la prédiction de la réponse pathologique complète des cancers mammaires. C Malhaire. 20. Journées thématiques de la division physique nucléaire de la Société Française de Physique : Nucléaire et Santé, 14 octobre 2023, Paris. Radiomique. F Orlhac. 21. IFAMP Training School, 17 october 2023, Skopje, North Macedonia. Radiomics and AI in medical imaging: What is working and what is not? I Buvat.
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	22. Journée Cancer du sein et Cancers gynécologiques, Institut Curie, Paris, 18 october 2023. Imagerie TEP-TDM dans les cancers gynécologiques. RD Seban. 23. 4^{ème} journée française sur la thérapie photodynamique, 2 novembre 2023, Ecole Nationale Supérieure de Chimie de Paris. Photodynamic therapy to treat retinoblastoma, a preclinical study from cell to mouse. C Thomas. 24. EFOMP Symposium on Molecular Radiotherapy Dosimetry, 9 november 2023, Athens, Greece. AI: a game changer in quantitative molecular imaging and clinical dosimetry. I Buvat. 25. Journée Scientifique et Médicale de l'Institut Curie, 12 novembre 2023, Institut Curie, Paris. L'imagerie médicale : une exploration non invasive pour détecter et caractériser des anomalies anatomiques, fonctionnelles et moléculaires. C Malhaire. 26. Journée Scientifique et Médicale de l'Institut Curie, 12 november 2023, Institut Curie, Paris. L'imagerie médicale : une exploration non invasive pour détecter et caractériser des anomalies anatomiques, fonctionnelles et moléculaires. I Buvat. 27. Quantitative Biosciences Institute. Artificial intelligence across biological scales symposium, December 6th 2023, University of California San Francisco, US. Whole-body molecular phenotyping of cancer. I Buvat.
List of organized meetings, workshops, seminars (indicate if at Curie, in France or international) -Meeting title -Date -Place -Presentation title -Authors	1. International: 9th international workshop on PET in lymphoma and myeloma (PILM 2023), 6-7 October 2023, Menton, France. Irène Buvat co-organizer with 4 other persons. 2. International: Organization of an AI challenge as part of the SNMMI Artificial Intelligence Task Force, May – December 2023. Ronald Boellaard and Irène Buvat co-organizers. 3. Curie: Webinar LITO, 17 January 2023, “Biomarqueurs TEP pronostics et prédictifs pour les patients atteints d'un cancer colorectal métastatique”, Erwin Woff. 4. Curie: Webinar LITO, 13 April 2023, “Méthodes de segmentation et détection de lésions par CNN : exemples en imagerie médicale”, Elodie Puybureau. 5. Curie: Webinar LITO, 7 June 2023, “Caractérisation des tumeurs cérébrales en IRM : de l'acquisition au traitement d'image”, Benjamin Lemasson. 6. Curie: Webinar LITO, 12 July 2023, “Detect, Predict, or Generate – Potential applications of deep learning in nuclear medicine and molecular imaging”, David Haberl. 7. Curie: Journée d'Imagerie des Cancers de la Femme, 6 Septembre 2023, Paris, “Evolutions technologiques en IRM mammaire : apports des techniques ultra-rapides et de la diffusion”, Caroline Malhaire. 8. Curie: organization of the “LITO Open house”, 13 December 2023, Irène Buvat, Frédérique Frouin, Fanny Orhac.
Public outreach (TV, radio, press...), specify if PI or Team members name: -Topic -Audience (eg. Researchers, general public)	1. Regular contributions over the year to “L'essentiel”, the Curie journal, Irène Buvat. 2. Participation in the “Jonquille contre le cancer 2023” campaign: Dossier “Dépister et diagnostiquer le cancer toujours plus tôt”, Dossier de presse, Irène Buvat. 3. Interview for France Culture by Tara Schlegel regarding the article entitled “The Safety of an Artificial Intelligence Supported Screen-Reading Procedure Versus Standard Double Reading in the Mammography Screening with Artificial

<i>-Media</i> <i>-Date</i>	Intelligence (MASAI) Trial: A Randomised, Controlled, Screening Accuracy Study” published in the Lancet Oncology, August 9th 2023, Irène Buvat. - Comptoir des sciences, 17 octobre, Lycée Rosa Parks, Thionville (distanciel), Carole Thomas. - DECLICS (Dialogues Entre Chercheurs et Lycéens pour les Intéresser à la Construction des Savoirs), 15 décembre, Lycée Henri Parriat, Montceau les Mines (distanciel), Carole Thomas. - DECLICS, 18 décembre, Lycée de Grand Air, Arcachon (distanciel), Carole Thomas. - DECLICS, 20 décembre, Lycée Etienne-Jules Marey, Beaunes (distanciel), Carole Thomas.
Expertise: commissions of trust (ERC panel, CNRS & Inserm Committees, advisory boards, etc.) <i>-Name</i> <i>-Elected or nominated member</i> <i>-Period of mandate (start & end if known)</i>	- Irène Buvat and Fanny Orlhac, member of the Artificial Intelligence Task Force of the Society of Nuclear Medicine and Molecular Imaging, USA (nominated), 2019-now. - Irène Buvat, Christophe Nioche, Fanny Orlhac, members of the International Biomarker Standardization Initiative (IBSI), 2018-now. - Irène Buvat, Institut Pascal, Université Paris Saclay, member of the scientific committee (nominated), 2016-now. - Irène Buvat, member of the “Commission Institutionnelle d’Ethique” of Institut Curie, 2021-now. - Irène Buvat, member of CSS7 Inserm, 2022-now. - Fanny Orlhac, member of Artificial Intelligence working group of Unicancer, 2019-now. - Fanny Orlhac, member of ANR CE 45 committee (17 grant applications).
Board memberships (e.g.: journal editor, etc.)	- Associate editor of the “Journal of Nuclear Medicine” (IF=9.3): management of ~ 60 manuscripts every year, since 2020. Irène Buvat - Associate editor of “Molecular Imaging and Biology” (IF=3.1): management of ~ 4 manuscripts every year, since 2020. Irène Buvat - Board member of “European Journal of Nuclear Medicine and Molecular Imaging” (IF=9.1): management of ~ 5 manuscripts every year, since 2019. Irène Buvat - Board member of “EJNMMI Research” (IF=3.2): management of ~3 manuscripts every year. Irène Buvat - Board member of “Physics in Medicine and Biology” (IF=3.5): management of ~10 manuscripts every year. Frédérique Frouin. - Womens’ imaging Section Editor of « European Journal of Radiology » (IF= 3.3), management of ~ 12 manuscripts every year. Caroline Malhaire.
Memberships of Scientific Societies	- Member of the Society of Nuclear Medicine and Molecular Imaging, Irène Buvat, Fanny Orlhac - Member of the European Alliance of Medical and Biological Engineering and Science (EAMBES), Irène Buvat - Member of the European Association of Nuclear Medicine, Irène Buvat, Fanny Orlhac, Marie Luporsi - Member of the European Society of Radiology, Irène Buvat - Member of the IEEE society, Irène Buvat - Member of the Société Française de Photobiologie, Carole Thomas - Member of the IEEE Engineering in Medicine and Biology Society, Frédérique Frouin - Member of the European Organisation for Research and Treatment of Cancer (EORTC) Imaging group, Caroline Malhaire

Others expertises (reviewer for scientific journals, expert for national and international funding bodies, e.g. ANR, ERC, etc)	1. Regular reviewers (>3 papers per year) for scientific journals: Journal of Nuclear Medicine (I Buvat, F Orlhac, RD Seban), Physics in Medicine and Biology (F Frouin), European Journal of Nuclear Medicine and Molecular Imaging (I Buvat, RD Seban), EJNMMI Research (I Buvat), EJNMMI Physics (I Buvat, F Orlhac), Molecular Imaging and Biology (I Buvat), Eur Radiology (F Frouin, F Orlhac), Cancers (C Thomas, L Champion, RD Seban), Cancer management and research (C Thomas), International Journal of Molecular sciences (C Thomas), International Journal of Radiation Oncology Biology and Physics (C Thomas), Investigative Ophthalmology and visual science (C Thomas), J Material chemistry B (C Thomas), J Porphyrin Phthalocyanines (C Thomas), Marine drugs (C Thomas), Nanoscale (C Thomas), Photochemical and Photobiological Sciences (C Thomas), Sci Pharm (C Thomas), Cancer management and research (C Thomas), PhotoDiagnosis and Photodynamic Therapy (C Thomas), Pharmaceuticals (C Thomas), European Journal of Cancer (RD Seban). 2. Expertise for international funding bodies: - Institut Jules Bordet, Belgium (I Buvat) (grants) - University of Leuven UKL (I Buvat) (Tenure track) - Society of Nuclear Medicine and Molecular Imaging (USA) Hoffmann Award (I Buvat) - Society of Nuclear Medicine and Molecular Imaging (USA): Mars Shot program grants (17) (I Buvat) - Medical University of Vienna (grants) (I Buvat) - Dutch Cancer Society (KWF Kankerbestrijding), Netherlands (RD Seban) - Swiss National Science Foundation (F Orlhac) 3. Expertise for national funding bodies: - ANR (I Buvat, F Frouin) - ANRT CIFRE grants (I Buvat, F Frouin) - Association Ruban Rose (I Buvat) - INCA (I Buvat) - 3IA Artificial Intelligence Institute Chaires (I Buvat) - Ligue contre le Cancer (F Frouin) - MESSIDORE (Inserm) (F Frouin) - Université Paris Saclay, ED 575, Concours Doctorants (F Frouin) - FSM/DGOS: AAP PHRC, France (RD Seban) 4. Reviews for international meetings: - Society of Nuclear Medicine and Molecular Imaging annual meeting (I Buvat, F Orlhac) - European Association of Nuclear Medicine annual meeting (I Buvat, F Orlhac) - European Congress of Radiology (I Buvat) - European Society of Molecular Imaging (ESMI) meeting (I Buvat, F Orlhac) 8. PhD thesis committees: - Cédric Desmonts, Apport des technologies TEMP et TEP numériques en médecine nucléaire dans le domaine de l'oncologie clinique et préclinique, Université Caen Normandie, 2023, I Buvat reviewer. - Hugo Schmutz, Apprentissage semi-supervisé, segmentation d'images TEP/TDM et prédiction de la réponse tumorale à l'immunothérapie, Université Côte d'Azur, 2023, I Buvat reviewer.
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	- Jessica Hopson, Automated Assessment of Clinical Brain PET Image Quality, King's College London, 2023, I Buvat reviewer. - Anthime Flaus, Leveraging Deep Learning to improve information extraction for FDG brain PET imaging, Université Claude Bernard Lyon 1, 2023, I Buvat reviewer. - Wyanne A. Noortman, Radiomics in [18F]FDG PET/CT: a leap in the dark, University of Twente, The Netherlands, 2023, I Buvat reviewer. - Lara Cavinato, Representation methods for imaging-based multi-level cancer heterogeneity: towards virtual biopsy and prognostic subtyping, Politecnico Milano, Italy, 2023, I Buvat reviewer. - Corinne Eertink, New perspectives on the role of PET imaging in diffuse large B-cell lymphoma, de Vrije Universiteit Amsterdam, The Netherlands, 2023, I Buvat reviewer. - Hamza Chegraoui, Machine learning for genomics and imaging data integration applied to neuro-oncology, Université Paris-Saclay, 2023, I Buvat member of the defense committee. - Arnaud Beddok, Optimisation de la sélection des patients et des plans de traitement pour la réirradiation des récidives de cancer de la tête et du cou guidée par l'imagerie multimodale, Université Paris Saclay, 2023, I Buvat and G Crehange co-supervisors. - Jérémie Calais, PSMA-targeted theranostics: From research to standard-of-care, Université Paris Saclay, 2023, I Buvat supervisor. - Thibault Escobar, Développement de modèles radiomiques par des approches d'apprentissage pour la planification et le suivi des traitements du cancer à partir d'images multiparamétriques TEP/TDM/IRM, Université Paris Saclay, 2023, I Buvat and L Champion co-supervisors. - Zhou Zao, Heart Segmentation and Evaluation of Fibrosis, Sorbonne Université, 2023, F Frouin reviewer. 7. Habilitation committees: - Philippe Garteiser, Développement et validation de techniques d'IRM pour la caractérisation des processus inflammatoires et cancéreux dans l'abdomen, Université Paris Cité, 2023, I Buvat reviewer. - Jean-Marc Vrigneaud, Approches de validation des performances physiques en micro-TEP et de la quantification en imagerie moléculaire, Université Bourgogne Franche Comté, 2023, I Buvat reviewer. - Béatrice Berthon, Apprentissage automatique et ultrasons ultrarapides pour un diagnostic non invasif, PSL Université, Paris, 2023, I Buvat reviewer.
CLINICAL ACTIVITIES	
Link with Curie Hospital or other -Person -Project -Fundings	1. Curie Hospital: Hervé Brisse / Caroline Malhaire (Medical Imaging department): Neotex, Radiomics in breast MRI to predict response to neoadjuvant chemotherapy. Participation in the EORTC BCG 1984 trial and in the IHU project. 2. Curie Hospital: François Clément Bidard (Medical Oncology) / Julien Fouque (Dpt of pharmacy) / Laurence Champion, Nina Jehanno and Hervé Brisse (Dpt of medical imaging), Fatima Mechta Grigoriou (Research center): Ga68-FAPI synthesis for clinical imaging of Fibroblast Activation Protein activation, PMS Sein funding and RHU Cassiopeia.

	3. Curie Hospital: Laurence Champion / Romain-David Seban (Dpt of Nuclear Medicine, Saint Cloud): Prediction of Axillary lymph node involvement and Metastasis occurrence in BREast cancer PET imaging using Artificial Intelligence, CIFRE grant of Thibault Escobar supported by Dosisoft 4. Curie Hospital: Nicolas Girard (Dpt of Thoracic Oncology), Nina Jehanno and Marie Luporsi (Dpt of Nuclear Medicine, Paris), Hervé Brisse (Dpt of Radiology, Paris): Radiomic approaches for lung cancer precision medicine, PANACEE project (Janseen Horizon funding), TIPIT project (Fondation Arc funding), Precision Predict project (BPI and Health Data Hub funding), NEMO-PET project (ANR JCJC funding) 5. Curie Hospital: Gilles Créhange, Valentin Calugaru, Arnaud Beddok (Dpt of Oncology – Radiotherapy): Radiomics for the characterization of tissue damages induced by radiation therapy and optimization of re-irradiation treatment plans, supervision of PhD thesis of Arnaud Beddok 6. Curie Hospital: Nathalie Cassoux (Dpt of Onco-ophtalmology), François Doz (Dpt of Onco-pediatrics), PhotoDynamicTherapy project for retinoblastoma treatment, Retinostop (fundings: PSL, Fondation l'Occitane, Retinostop) 7. Curie Hospital: Neuroblastomics: Marie Luporsi and Nina Jehanno (Dpt of Nuclear Medicine, Paris), Hervé Brisse (Dpt of Radiology, Paris), Gudrun Schleiermacher (Dpt of Pediatric Oncology): Radiomics for the characterization of neuroblastoma based on MIBG SPECT imaging. 8. Curie Hospital: Retinomics : F Frouin, L Cardoen Dpt of Radiology. 9. Other - Centre Antoine Lassagne - Nice: Jacques Darcourt, Olivier Humbert (Dpt of Nuclear Medicine): Identification of Parkinsonian patients based on 18F-FDOPA PET images and deep learning methods to predict lung cancer patient survival for immunotherapy (3IA Côte d'Azur and LITO funding) 10. Other - Centre Antoine Lassagne - Nice: FEDERATED-PET: Olivier Humbert (Dpt of Nuclear Medicine) and Marco Lorenzi (Inria): first french federated learning initiative based on PET images to predict response to immunotherapy for lung cancer patients (PRTK) 11. Other - Dpt of Nuclear Medicine, Cochin Hospital, Paris: Anne-Ségolène Cottureau, Design and validation of PET imaging prognostic biomarkers for lymphoma patients. Siemens funding as part of a CIFRE contract with Louis Rebaud. 12. Other - Dpt of Radiology, Avicenne Hospital, Bobigny: Pierre-Yves Brillet, IRMomics in lung cancer patients (LITO funding). 13. Other – Dpt of Surgery and Nuclear Medicine, Avicenne Hospital, Bobigny: PHRC VOCALE and VOCALISE project.
DISTINCTIONS	
List of Awards for PI -Title -Date -Country	n/a
List of Awards for Team Members -Title -Date	- Alavi-Mandell award by the American Society of Nuclear Medicine and Molecular Imaging (SNMMI) to Kibrom Girum (post-doc) for his article entitled “18F-FDG PET Maximum-Intensity Projections and Artificial Intelligence: A Win-Win Combination to Easily Measure Prognostic Biomarkers in DLBCL Patients”

-Country	
List of Promotions (CR1, DR1, etc.) for PI & Team members Only for CNRS, Inserm, Universities members - Name -Date -Grade	Irène Buvat : DR1 CNRS → DRCE1 CNRS, March 2023.
List of Recruitments (new permanent CNRS, Inserm, Univ.) for Team members Only for CNRS, Inserm, Universities members -Name -Date -If Inserm, CNRS, Universities	n/a
List of Researchers HDR for PI & Team members -Date obtained	1. Hervé Brisse, PH Curie 2. Irène Buvat, DR CNRS, 1998 3. Gilles Créhange, PUPH UVSQ, 4. Frédérique Frouin, CRHC Inserm, 5. Steven Le Gouill, PUPH UVSQ 6. Carole Thomas, CRCN Inserm, 2008
ON-GOING FUNDED PROJECTS & COLLABORATIONS	
NATIONAL - Individual projects Project Title Translational or not Funding source Managed by Curie, CNRS... Total Amount - k€ Period (start-end) Publications or Patents <i>Indicate the number in your list</i>	PANACEE , translational , PI: Fanny Orlhac, funded by Janssen Horizon, managed by Curie, 150 k€, 2020-2023. Publications: Number 1. NEMO-PET , translational , PI: Fanny Orlhac, funded by ANR JCJC, managed by Curie, 226 k€, 2022-2026. Publications: not yet
INTERNATIONAL - Individual projects Project Title Translational or not Funding source Managed by Curie, CNRS... Total Amount - k€ Period (start-end) Publications or Patents <i>Indicate the number in</i>	n/a

your list	
INDUSTRIAL - Individual projects Project Title Translational or not Funding source Managed by Curie, CNRS... Total Amount - k€ Period (start-end) Publications or Patents Indicate the number in your list	1. CIFRE grant of Thibault Escobar funded by Dosisoft: Development of radiomic models for treatment planning and patient monitoring in PET/CT/MRI, translational. Contract managed by Curie, 60 k€ for Curie + 118 k€ for the PhD salary directly supported by Dosisoft, 2020-2023. Publications: Escobar et al Med Phys 2022, and Number 23 and 27 this year. 2. CIFRE grant of Louis Rebaud funded by Siemens Healthineers: Whole-body and total-body biomarkers in PET/CT imaging, translational. Contract managed by Curie, 73 k€ for Curie + 118 k€ for the PhD salary directly supported by Siemens, 2021-2024. Publications: Durmo et al Hemat Oncol 2022, Girum et al J Nucl Med 2022, and Number 3, 6 and 27 this year. 3. CIFRE grant of Maria Grazia Ronga funded by Thales: Study of very high energy electron radiation therapy (VHEE). Contract managed by Curie, 79 k€ for Curie + 118 k€ for the PhD salary directly supported by Thales, 2021-2024. Publications: Ronga et al Cancers 2021, and Number 12, 13, 30 this year.
NATIONAL - Collaborative projects Project Title Translational or not PI role: PI Role: <i>Coord. or Part.</i> Funding source Managed by Curie, CNRS... Total Amount - k€ Period (start-end) Publications or Patents Indicate the number in your list	1. PHRC-I FAP-IT, translational. PI: Romain-David Seban, funded by DGOS, managed by Curie Hospital, 429 k€ for Curie, 2023-2026. No publication yet. 2. PRT-K DEFI-LOC, translational. PI: Carole Soussain, funded by DGOS and INCA, managed by Curie Hospital, 389 k€ for Curie, 2023-2026. No publication yet. 3. PRT-K Federated-PET, translational. PI: Olivier Humbert, funded by DGOS and INCA, managed by CAL and Inria, 63k€ for LITO, 2023-2026. No publication yet. 4. Precision-Predict, translational, PI: Nicolas Girard, Co-PI in LITO: Irène Buvat and Fanny Orlhac (partners), funded by BPI France and Health Data Hub, managed by Curie, 300 k€ for Curie, 2020-2023. No publication yet. 5. TIPIT, translational, PI: Emmanuel Barillot, PI in LITO: Irène Buvat and Fanny Orlhac (partners), funded by Fondation Arc, managed by Curie, 600 k€ (~180 k€ for LITO), 2020-2023. Publication: Number 1. 6. AgeMed 2.0, translational, From aged cells to medical applications, PI: Eric Gilson, PI Curie: Irène Buvat (partner), managed by Inserm, 61.5 k€, 2020-2024. No publication yet. 7. BIOMEDE-IA, translational, Artificial Intelligence tools for DIPG characterization PI: Frédérique Frouin, funded by Gustave-Roussy, managed by Inserm, 120 k€, 2020-2023. Publication: Number 23. 8. VOCALE, translational: Detection of recurrent nerve palsy using echography, PHRC-I PI C Trésallet, coPI Frédérique Frouin, managed by Inserm, 110 k€, 2019-2025. No publication yet. 9. EXOGLYC: Cardiac vectoring of extracellular vesicles by modification of their glycosylation, PI: Philippe Menasché, PI Curie: Claire Provost, ANR funding managed by Curie (24 k€ for LITO), 2021-2023. No publication yet. 10. Retinoblastomics, translational Inter- and intratumoral heterogeneity of retinoblastomas, funded by Projet Ligue contre le cancer, PI F Radvanyi, coPI Irène Buvat, Hervé Brisse, managed by Curie, 49 k€, 2021-2026. No publication yet. 11. Indigo-Pancreas, translational: Cutting Edge Imaging for Earlier Pancreatic Cancer Diagnosis: evaluation of Positron Emission Tomography (PET) with the Fibroblast Activation Protein Inhibitor (FAPI), PI : Cindy Neuzillet, funded by ARC, 104 k€ for LITO, 2023-2027. No publication yet.

	12. pMBRT : Radiothérapie par mini-faisceaux de protons : une nouvelle approche pour réduire les toxicités, PI : Yolanda Prezado, funded by INCA, 177 k€ for LITO, 2023-2027, No publication yet.
INTERNATIONAL - Collaborative projects Project Title Translational or not PI role: PI Role: <i>Coord. or Part.</i> Funding source Managed by Curie, CNRS... Total Amount - k€ Period (start-end) Publications or Patents <i>Indicate the number in your list</i>	1. HOLY2020 , translational , PI in France: Irène Buvat (partner), funded by EraCoSysMed3rd joined transnational call (ANR-19-SYME-0005-03 contract), managed by Curie, 237 k€ for LITO, 2020-2023. Publications: Girum et al J Nucl Med 2022, and number 6 and 27 this year. 2. Inter-Organ PET , translational , PI: Irène Buvat (LITO) and Thomas Beyer (Medical University of Vienna), funded by ANR PRCI, managed by Curie, 293 k€ for LITO, 2023-2026. Publications: not yet
INDUSTRIAL - Collaborative projects Project Title Translational or not PI role: PI Role: <i>Coord. or Part.</i> Funding source Managed by Curie, CNRS... Total Amount - k€ Period (start-end) Publications or Patents <i>Indicate the number in your list</i>	1. AI.DReAM , translational , PI: Baptiste Perrin GE Healthcare, PI Curie: Irène Buvat (partner), funded by BPI France, managed by Curie, 710 k€, 2020-2025. Publications: not yet. 2. RHU CASSIOPEIA , translational , PI: Fatima Mechta-Grigoriou Institut Curie, funded by ANR, managed by Curie, 9966 k€, 2022-2027. Publication: Peltier et al Semin Cancer Biol 2022. 3. VOCALISE , translational , PI: Frédérique Frouin, funded by ANR, managed by Curie, 160 k€ for LITO (499 k€ in total), 2022-2026. Publications: not yet.
Collaborations with the USA - <i>Researcher's name</i> - <i>Researcher's Institute</i> <i>If she/he has publications, write the DOI</i>	1. Tyler Bradshaw, University of Wisconsin School of Medicine and Public Health and SNMMI AI Task Force doi: 10.1148/ryai.220232 doi: 10.1148/ryai.220281 Publication number 25 this year.
Other international collaborations	International group of lymphoma experts. Heiko Schöder - MSKCC New York, Sally Barrington - King's College London, Ronald Boellaard -VUMC Amsterdam, Luca Ceriani - Lugano, Luca Guerra – Milano, etc
Other French collaborations	LYSA – Lymphoma Study Association, France : Participation in a new project, BIDIFLY, focusing on the multi-omic characterization of follicular lymphoma and on the design of stratification models led by Dr Clémentine Sarkozy and funded by IFLI (https://i-flt.org , 7 M€) (cf highlights of the year).
Other highlights of the year	Installation of the microPET/CT scanner in the radeXp platform, that will enable the development of the preclinical PET research projects.
Comments	