Andrea Bettinelli

Nationality: Italian

Mother tongue: Italian

H-index: 10

AREA OF EXPERTISE

My main interest is the applications of mathematical and statistical models to characterize and extract useful information from biomedical images. My research area includes:

- Image analysis: development of automatic pipelines for large-data image processing (e.g., image denoising, image filtering, image quantification).
- Texture analysis: characterization of the texture contained within bioimages through the extraction of quantitative features (radiomics).
- Machine/statistical-learning: application of machine-learning and data-mining techniques to build prognostic, predictive, classification, and regression models.
- Deep-learning: application of deep learning architectures for advanced image analysis.
- Statistical analysis: application of descriptive statistics and usage of statistical hypothesis tests on clinical data.
- Software development: programming and graphical user interface (GUI) development for the creation of user friendly and reusable software packages.
- Data handling and data integration: management of various image data formats and integration between imaging and clinical databases.

PROFESSIONAL EXPERIENCES

- Health Researcher at the Medical Physics Department of Veneto Institute of Oncology - (IOV) IRCCS.
  Start (2023, 07) – Ongoing
- Lecturer in the Master's Program "Radiomics: tecniche avanzate ed analisi quantitative delle immagini" – University of Padua.
  Start (2025, 02) – End (2025, 02)
- Collaboration with the Medical Physics Department of Veneto Institute of Oncology - (IOV) IRCCS for research purposes.
  Start (2019, 10) – End (2023, 06)
- Tutor Junior at University of Padua (Padua, Italy) for "Statistical methods for Bioengineering" and "Elements of Informatics in Python"
  Start (2021, 10) – End (2022, 02)
- Data Scientist for radiomic studies at Veneto Institute of Oncology - (IOV) IRCCS, Padua
  Start (2018, 06) – End (2019, 09)

EDUCATION

Postgraduate Degree

PhD in Information Engineering XXXV cycle (curriculum in Bioengineering)
University of Padua, Padua, Italy
Start (2019, 10) – (2023, 03)
ECTS (or CFU) at present time: 26 (over 20)
Supervisor: Professor Bertoldo Alessandra
Co-supervisor: Dr. Paiusco Marta

Graduate studies

Master's Degree in Bioengineering
University of Padua, Padua, Italy
Start (2016, 01) – End (2018, 04)
Final Grade: 110 (over 110) cum laude
Final Degree Project: Voxel-wise parametric mapping of glucose brain metabolism with an automatic image-derived arterial input function from multimodal 18F-FDG PET/MR data
Final Degree Project Brief Description: The aim of the study was the analysis of 18F-FDG dynamic PET data and had two sub-goals: (1) the automatic derivation of the input function (IDIF) from lower carotids and (2) a model-fitting procedure to derive parameter estimates in a Variational Bayesian Approach. Internal carotids were segmented from early summed frames to obtain the IDIF. The function was then fitted to reduce noise contributes, delay corrected per region of interest, rescaled and subsequently used in a Variational Bayesian Approach, with ROI gold-standard prior estimates, to obtain parametric maps. The obtained maps were consistent to literature values.
Supervisor: Professor Bertoldo Alessandra
ECTS (or CFU): 123 (over 120)
Grade Point Average: 28.79 (over 30)

Undergraduate studies

Bachelor's degree in Information Technology Engineering
University of Padua, Padua, Italy
Start (2011, 09) – End (2015, 11)
Final Degree Project: Modellizzazione e controllo di un sistema di bilanciamento
Supervisor: Professor Valcher Maria Elena

High School

High School Diploma at Liceo Scientifico P. Paleocapa, Rovigo, Italy
Start (2006, 09) – End (2011, 07)

OTHER RELEVANT EDUCATIONAL EXPERIENCES

PhD Abroad Period
Host Institution: OncoRay (National Center for Radiation Research in Oncology), Dresden, Germany. Start (2022, 08) – End (2022, 10)

Erasmus Programme
Host Institution: Graz University of Technology, Graz, Austria
Start (2017, 02) – End (2017, 07)

PERSONAL SKILLS

English

UNDERSTANDING		SPEAKING		WRITING
Listening	**Reading**	**Spoken interaction**	**Spoken production**	
B2	C1	C1	B2	B2
Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user Common European Framework of Reference for Languages				

Other language(s) French (A1), German (A1)

Computer skills Advanced: **Matlab, Simulink, Office Suite, Google Docs, Photoshop, Blender, 3D slicer**
Intermediate: **Java, R software, Phyton, Github**
Basic: **SQL, Raystation, Eclipse**

Other skills During my studies and my working experiences I have developed interpersonal skills based on respect and acceptance. I have good abilities as a team player and good communication capabilities, acquired during workshops and team works. I had the opportunity to successfully coordinate a multicentre group of IRCCS, achieving the publication of the obtained results. Good capabilities of software development, software maintenance and software publication. Excellent abilities of scientific writing and reporting. Reviewer activity for "PLOS ONE", "Physica Medica", "Radiotherapy and Oncology", "Scientific Reports" and "European Journal of Radiology".

Expert Photographer.

ADDITIONAL INFORMATION

Conferences, workshops and training schools

- IRC: Basic Life Support and Defibrillation (**BLSD**), 11 February 2026, Padua, Italy
- "**Technology Transfer School** per ricercatori degli IRCCS", 22-23 January 2026, Rome
- "ESTRO Physics Workshop 2025: **3D printing in radiation oncology**: steps toward a more general application in clinical practice", 23-24 October 2025, Toulouse, France
- **"13° Congresso Nazionale AIFM 2023"**, 16-19 October 2025, Verona, Italy
- "OECI course: **How to Develop and Write a Successful Grant Application**", 8-10 October 2025, Warsaw, Poland
- "ESTRO - **Basic Clicnical Radiobiology**", 7-11 September 2025, Rome
- "INAIL course: **La gestione della sicurezza in un sito RM: criticità e sviluppi futuri**", 20-22 May 2025, Rome
- "**Annual Meeting ACC 2024**", 20-30 November 2024, Reggio Emilia, Italy
- "**ESTRO Physics Workshop 2024 - hosting a joint physics & biology workshop**", 18-19 October 2024, Krakow, Poland
- "**5th European Congress of Medical Physics**", 11-14 September 2024, Munich, Germany

- **"GliMR Training School – Advanced MRI for glioma imaging diagnostics"**, 22-25 January 2024, Padua, Italy (invited trainer)
- **"AIFM course: Software certificati per l'analisi di immagini nella pratica clinica: attività del fisico medico"**, 8-9 November 2023, Bergamo, Italy
- **"8th Annual Meeting ACC 2023"**, 27-29 September 2023, Genoa, Italy
- **"34th Pezcoller Symposium"**, 19-20 June 2023, Trento, Italy
- **"12° Congresso Nazionale AIFM 2023"**, 8-11 June 2023, Florence, Italy
- **"4th GliMR Annual Meeting 2023 – Past, present and future"**, 3-5 May 2023, Porto, Portugal
- **"Society of Imaging Informatics in Medicine (SIIM) annual meeting"**, 9-11 June 2022, Kissimmee (online), Florida, USA (invited speaker for oral presentation)
- **"The 4th European Congress of Medical Physics (ECMP)"**, 18-20 August 2022, Dublin, Ireland
- **"GliMR Training School – Artificial Intelligence in Neuro-Oncology"**, 25-27 July 2022, Dublin, Ireland
- **"ECR 2022 - It's time to change"**, 13-17 July 2022, Wien, Austria
- **"2021 Physics Workshop - Science in Development: Mining the radiotherapy dose: exploring dose-response patterns in radiation therapy"**, 22-23 October 2021, Budapest (online), Hungary
- **"Radiomics toolbox: workflow & quality management"**, 8-10 September 2021, Pavia, Italy
- **"The 3rd European Congress of Medical Physics (ECMP)",** 16-19 June 2021, Turin, Italy
- **"RSNA 106th Annual Meeting"**, 29 November - 05 December 2020, Chicago (online), Illinois, USA
- **"XXXIX Annual School of Bioengineering"**, 7-10 September 2020, Brixen (online), Italy
- **"3rd ESTRO Physics Workshop: Multi-source data fusion for decision support systems in radiation oncology: opportunities, methodologies, standardizations and clinical translation"**, 25-26 October 2019, Budapest, Hungary
- **"Big Data for Imaging"**, 9-12 December 2018, Maastricht, The Netherlands
- **"XXXV Annual School of Bioengineering: La bioingegneria per il benessere e l'invecchiamento attivo"**, 26-29 September 2016, Brixen, Italy

Other Two-week language courses:

- 2006 Cambridge, English, level upper intermediate
- 2007 Paris, French, level B1
- 2008 Edinburgh, English, level C1/ ESOL level B2.1
- 2009 Leicester, English, level advanced
- 2010 Southampton, English

2017 German breakthrough 1, level A1/1 ST phase

ACCEPTED PUBLICATIONS ON INTERNATIONAL JOURNALS

1. De Monte F, Giannone A, **Bettinelli A**, Annoni G, Butera G, Cannatà V, Cheli M, Ciucci D, Donti A, Favetta M, Formigari R, Fraccaro C, Gaio G, Giordano M, Levrero F, Meliota G, Montefoschi D, Palmacci F, Rossetti V, Russo MG, Santoro G, Zorz A, Salvo GD, Castaldi B, Paiusco M. Patient exposure in paediatric Interventional Cardiology: a multicenter inter-comparison of clinical practices in Italy. Phys Med. 2026 Feb 13;143:105754. doi: 10.1016/j.ejmp.2026.105754. Epub ahead of print. PMID: 41690266.
2. **Bettinelli A**, Marturano F, Pirrone G, Gioscio E, Avanzo M, Fanizzi A, Garibaldi C, Massafra R, Menghi E, Placidi L, Rancati T, Paiusco M. Assessing the agreement of radiomic tools for dosiomics: A multi-software comparative study. Med Phys. 2026 Jan;53(1):e70203. doi: 10.1002/mp.70203. PMID: 41423685; PMCID: PMC12719379.
3. Sapignoli S, **Bettinelli A**, Caricato P, Amico AG, Cavinato S, Ceroni P, Guida F, Pivato N, Paronetto C, Elkhouzai B, Sepulcri M, Krengli M, Paiusco M. Bladder surface-based analysis proves the advantages of online adaptive radiotherapy over plan of the day. Phys Med. 2025 Dec;140:105677. doi: 10.1016/j.ejmp.2025.105677. Epub 2025 Nov 22. PMID: 41275771.
4. Cavinato S, Amico AG, **Bettinelli A**, Caricato P, Ceroni P, Khouzai BE, Guida F, Paiusco M, Paronetto C, Pivato N, Rossato MA, Sapignoli S, Sepulcri M, Scaggion A. Exploring plan quality: using plan complexity to quantitatively analyse the tradeoff between clinical suitability and dosimetric accuracy. Phys Med. 2025 Aug;136:105026. doi: 10.1016/j.ejmp.2025.105026. Epub 2025 Jun 21. PMID: 40544792.
5. Schiulaz A, Nordio G, Giacomel A, Easmin R, **Bettinelli A**, Selvaggi P, Williams S, Turkheimer F, Jauhar S, Howes O, Veronese M; FDOPA PET Imaging Working Group. Radiomic Analysis of Striatal [18F]FDOPA PET Imaging in Patients with Psychosis for the Identification of Antipsychotic Response. Mol Imaging Biol. 2025 Jun;27(3):365-378. doi: 10.1007/s11307-025-02014-3. Epub 2025 May 5. PMID: 40323469; PMCID: PMC12162767.
6. Loi E, Feliciani G, Amadori M, **Bettinelli A**, Marturano F, Azzali I, Mezzenga E, Sanna PA, Severi D, Rivetti S, Paiusco M, Martinelli G, Sarnelli A, Falcini F. Breast density prediction model in digital versus synthetic mammograms from a radiomic point of view: A retrospective study. Phys Med. 2025 Mar;131:104942. doi: 10.1016/j.ejmp.2025.104942. Epub 2025 Feb 24. PMID: 39999511.
7. De Francisci M, Silvestri E, **Bettinelli A**, Volpi T, Goyal MS, Vlassenko AG, Cecchin D, Bertoldo A. EMATA: a toolbox for the automatic extraction and modeling of arterial inputs for tracer kinetic analysis in [18F]FDG brain studies. EJNMMI Phys. 2024 Dec 24;11(1):105. doi: 10.1186/s40658-024-00707-2. PMID: 39715888; PMCID: PMC11666860.
8. Zorz A, Rossato MA, Turco P, Colombo Gomez LM, **Bettinelli A**, De Monte F, Paiusco M, Zucchetta P, Cecchin D. Performance evaluation of the 3D-ring cadmium-zinc-telluride (CZT) StarGuide system according to the NEMA NU 1-2018 standard. EJNMMI Phys. 2024 Jul 25;11(1):69. doi: 10.1186/s40658-024-00671-x. PMID: 39052176; PMCID: PMC11272762.

9. 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 S, Marturano F, Morin O, Nioche C, Orlhac F, Pati S, Rahmim A, Rezaeijo 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. 2024 Feb;310(2):e231319. doi: 10.1148/radiol.231319. PMID: 38319168; PMCID: PMC10902595.

10. Busato F, Fiorentin D, **Bettinelli A**, Anile G, Ghi MG, Scaggion A, Dusi F, Paiusco M, Ferrari M, Nicolai P, Marturano F. Dosiomic-based prediction of dysgeusia in head & neck cancer patients treated with radiotherapy. Radiother Oncol. 2023 Nov;188:109896. doi: 10.1016/j.radonc.2023.109896. Epub 2023 Sep 1. PMID: 37660751.

11. Marturano F, Guglielmo P, **Bettinelli A**, Zattoni F, Novara G, Zorz A, Sepulcri M, Gregianin M, Paiusco M, Evangelista L. Role of radiomic analysis of [18F]fluoromethylcholine PET/CT in predicting biochemical recurrence in a cohort of intermediate and high risk prostate cancer patients at initial staging. Eur Radiol. 2023 Oct;33(10):7199-7208. doi: 10.1007/s00330-023-09642-9. Epub 2023 Apr 20. PMID: 37079030; PMCID: PMC10511374.

12. Guglielmo P, Marturano F, **Bettinelli A**, Sepulcri M, Pasello G, Gregianin M, Paiusco M, Evangelista L. Additional Value of PET and CT Image-Based Features in the Detection of Occult Lymph Node Metastases in Lung Cancer: A Systematic Review of the Literature. Diagnostics (Basel). 2023 Jun 23;13(13):2153. doi: 10.3390/diagnostics13132153. PMID: 37443547; PMCID: PMC10340586.

13. Cavinato S, **Bettinelli A**, Dusi F, Fusella M, Germani A, Marturano F, Paiusco M, Pivato N, Rossato MA, Scaggion A. Prediction models as decision-support tools for virtual patient-specific quality assurance of helical tomotherapy plans. Phys Imaging Radiat Oncol. 2023 Mar 28;26:100435. doi: 10.1016/j.phro.2023.100435. PMID: 37089905; PMCID: PMC10113896.

14. **Bettinelli A**, Marturano F, Sarnelli A, Bertoldo A, Paiusco M. The ImSURE phantoms: a digital dataset for radiomic software benchmarking and investigation. Sci Data. 2022 Nov 12;9(1):695. doi: 10.1038/s41597-022-01715-6. PMID: 36371503; PMCID: PMC9653377.

15. Braghetto A, Marturano F, Paiusco M, Baiesi M, **Bettinelli A**. Author Correction: Radiomics and deep learning methods for the prediction of 2-year overall survival in LUNG1 dataset. Sci Rep. 2023 Oct 16;13(1):17561. doi: 10.1038/s41598-023-44197-1. Erratum for: Sci Rep. 2022 Aug 19;12(1):14132. PMID: 37845291; PMCID: PMC10579397.

16. **Bettinelli A**, Marturano F, Avanzo M, Loi E, Menghi E, Mezzenga E, Pirrone G, Sarnelli A, Strigari L, Strolin S, Paiusco M. A Novel Benchmarking Approach to Assess the Agreement among Radiomic Tools. Radiology. 2022 Jun;303(3):533-541. doi: 10.1148/radiol.211604. Epub 2022 Mar 1. Erratum in: Radiology. 2022 May;303(2):E30. PMID: 35230182.

17. Silvestri E, Volpi T, **Bettinelli A**, De Francisci M, Jones J, Corbetta M, Cecchin D, Bertoldo A. Image-derived Input Function in brain [18F]FDG PET data: which alternatives to the carotid siphons? Annu Int Conf IEEE Eng Med Biol Soc. 2022 Jul;2022:243-246. doi: 10.1109/EMBC48229.2022.9871200. PMID: 36085666.

18. Guglielmo P, Marturano F, **Bettinelli A**, Gregianin M, Paiusco M, Evangelista L. Additional Value of PET Radiomic Features for the Initial Staging of Prostate Cancer: A Systematic Review from the Literature. Cancers (Basel). 2021 Nov 30;13(23):6026. doi: 10.3390/cancers13236026. PMID: 34885135; PMCID: PMC8657371.

19. Fantini L, Belli ML, Azzali I, Loi E, **Bettinelli A**, Feliciani G, Mezzenga E, Fedeli A, Asioli S, Paganelli G, Sarnelli A, Matteucci F. Exploratory Analysis of 18F-3'-deoxy-3'-fluorothymidine (18F-FLT) PET/CT-Based Radiomics for the Early Evaluation of Response to Neoadjuvant Chemotherapy in Patients With Locally Advanced Breast Cancer. Front Oncol. 2021 Jun 24;11:601053. doi: 10.3389/fonc.2021.601053. PMID: 34249671; PMCID: PMC8264651.

20. De Monte F, Castaldi B, Branchini M, **Bettinelli A**, Milanesi O, Paiusco M, Roggio A. Typical values for pediatric interventional cardiology catheterizations: A standardized approach towards Diagnostic Reference Level establishment. Phys Med. 2020 Aug;76:134-141. doi: 10.1016/j.ejmp.2020.07.001. Epub 2020 Jul 13. PMID: 32673825.

21. Scaggion A, Fusella M, Agnello G, **Bettinelli A**, Pivato N, Roggio A, Rossato MA, Sepulcri M, Paiusco M. Limiting treatment plan complexity by applying a novel commercial tool. J Appl Clin Med Phys. 2020 Aug;21(8):27-34. doi: 10.1002/acm2.12908. Epub 2020 May 21. PMID: 32436656; PMCID: PMC7484888.

22. Bettinelli A, Branchini M, De Monte F, Scaggion A, Paiusco M. Technical Note: An IBEX adaption toward image biomarker standardization. Med Phys. 2020 Mar;47(3):1167-1173. doi: 10.1002/mp.13956. Epub 2020 Jan 20. PMID: 31830303.

23. Branchini M, Zorz A, Zucchetta P, **Bettinelli A**, De Monte F, Cecchin D, Paiusco M. Impact of acquisition count statistics reduction and SUV discretization on PET radiomic features in pediatric 18F-FDG-PET/MRI examinations. Phys Med. 2019 Mar;59:117-126. doi: 10.1016/j.ejmp.2019.03.005. Epub 2019 Mar 16. PMID: 30928060.