



# Chiara Razzetta

## Curriculum Vitae

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2/11/2023- **"Assegnista di ricerca"**, DIMA - University of Genoa, Genova, PNRR RAISE -  
Now Robotics and AI for Socio-economic Empowerment  
Supervisor: Michele Piana

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### Education

1/11/2020- **PhD candidate in Mathematics and Applications**, University of Genoa, Genova,  
31/10/2023 Thesis: *A study on modeling and optimization of bionedical ultrasound imaging*.  
Defence date: May 3<sup>rd</sup>, 2024  
Supervisors: Prof. Federico Benvenuto, Marco Crocco Ph.D.

1/03/2018 - **Master's Degree in Applied Mathematics**, University of Genoa, Genova, Thesis: *Il*  
27/05/2020 *problema inverso dell'imaging biomedicale a ultrasuoni: dalla teoria alla simulazione*  
*numerica*. Grade: 110/110 cum Laude  
Supervisors: Prof. Federico Benvenuto, Marco Crocco Ph.D.

15/09/2014 - **Bachelor Degree in Mathematics**, University of Genoa, Genova, Thesis: *Branching*  
15/03/2018 *Process discreto: estinzione e mutazione di una popolazione di cellule*. Grade:  
97/110  
Supervisor: Prof. Veronica Umanitá

### Attended specialization courses

June 2022 **14th IEEE EMBS-SPS International Summer School on Biomedical Imaging**,  
*IMT Atlantique Bretagne-Pays de la Loire*

- Recent advances in acquisition and reconstruction for accelerated MRI
- Machine Learning for Medical Images
- Assessing Cellular Morphology and Tissue Architecture
- Inverse Problem in Fluorescent Microscopy and Super-Resolution

- February 2021 **TraDE-OPT Winter School on Convex Optimization**, *virtually hosted at TU Braunschweig*
- Convex Analysis
  - Convex Optimization Algorithms
- March 2020 - June 2020 **Certificazione dell'acquisizione dei 24 cfu per l'insegnamento nella scuola secondaria (D.M. 616/2017)**, *Università degli Studi di Genova, DISFOR*, conseguita il 1/07/2020
- Pedagogia, pedagogia speciale e didattica dell'inclusione (6 cfu di cui M-PED/01 3 cfu, M-PED/03 3 cfu) per Ambito Disciplinare A
  - Psicologia (6 cfu di cui M-PSI/06 1 cfu, M-PSI/05 2 cfu, M-PSI/01 1 cfu, M-PSI/04 2 cfu) per Ambito Disciplinare B
  - Antropologia (6 cfu di cui M-FIL/03 3 cfu, M-DEA/01 3 cfu) per Ambito Disciplinare C
  - Metodi e tecnologie didattiche (6 cfu di cui M-PED/03 1 cfu, M-PED/04 5 cfu) per Ambito Disciplinare D

## Experience

- 1 October 2019 - 31 November 2019 **Intern**, ESAOTE, Genova
- Testing denoising algorithms for speckle noise pattern in ultrasound medical images.

## Miscellaneous

- 2016-2018 Homework Tutor, Caritas

## Papers

- 2023 **Razzetta C., Candiani V., Crocco M. and Benvenuto F.**, *A hybrid time-frequency parametric modelling of medical ultrasound signal transmission*  
<https://www.aims sciences.org/article/doi/10.3934/acse.2023011>

## Preprints

- 2022 **Razzetta C., Crocco M. and Benvenuto F.**, *A stochastic approach to delays optimization for narrowband transmit beam pattern in medical ultrasound*, Submitted  
<https://arxiv.org/abs/2209.05758>

## Research Projects Participation

- 2022 **Metodi numerici per l'imaging: dal 2D al 3D**, *INdAM-GNCS*, Coordinator: Prof. Silvia Tozza  
The project aims to develop computational methods for three-dimensional image analysis to solve problems in reconstruction, pattern recognition, segmentation, denoising and image restoration.
- 2020 **MyLab 4.0**, *Esaote S.p.A. - Agenda Digitale FRI*, Coordinator: Pietro Amoretti  
The project aims to evolve the current process of managing ultrasound diagnostics from a simple tool for analysis by the physician to an integrated digital service structure for echo-guided diagnostic and interventional radiology available to the entire health care facility, for the benefit of the patient, no matter where the health care service is accessed.

2020 **Problemi inversi e applicazioni**, DIMA - Fondi di Ricerca di Ateneo 2020, Coordinator: Prof. Federico Benvenuto

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## Software development

2022-2023 **parUST (parallel parametric UltraSound Transmission software)**, A Python simulator for medical ultrasound linear array probe beam pattern computation. The simulator allows parallelized computations on multiple threads of the impulse response function in order to approximate Beam pattern shapes. After the impulse response computing, the Beam patterns can be computed on CPUs or GPUs cores at the user's discretion.  
<https://github.com/chiararazzetta/parUST>

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## Talks and Presentations

### Lectures at international schools

2023 **Winter PhD school on Advanced methods for mathematical image analysis**, Bologna, Title: "Ultrasound Biomedical Imaging: improve image quality by automatically optimizing parameters"

### Invited Talks

2023 **Dolomites Research Week on Approximation and Applications**, San Vito di Cadore, Title: "Delay and Sum beamforming Point Spread Function: local invariance and its consequences .

2023 **International Congress of Industrial and Applied Mathematics (ICIAM23)**, Tokyo, Title: "A local space-invariant approximation for DAS Point Spread Function calculation".

2023 **The Artimino conference on Medical Ultrasound Technology**, Artimino, Title: "Stochastic approach for automatic optimisation of acquisition parameters for Point Spread Function enhancement"

2022 **GIMC-SIMAI YOUNG 2022**, Pavia, Title: "Biomedical Ultrasound Beam Patterns Optimization: from a stochastic approach to neural networks"

### Contributions in Conferences and Seminars

2023 **SIAM Conference on Computational Science and Engineering**, Amsterdam, Poster: "A stochastic approach to delays optimization for narrowband transmit beam pattern in medical ultrasound"

2022 **14th IEEE EMBS-SPS International Summer School on Biomedical Imaging**, St. Jacut de la Mer, Poster: "A stochastic approach to transmit delays optimization: enhancing narrowband applications in medical ultrasound"

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## Teaching and Tutoring Experiences

### Teaching

A.A. 2023/24 **Adjunct Professor**, DICCA-UniGe, Course, Elements of Mathematics and Geometry for Technical Occupations

- A.A. 2023/24 **Teaching Assistant**, *DIEC-UniGe*  
Exercise sessions and teaching support for Mathematics course
- A.A. 2022/23 **Adjunct Professor**, *DIMA-UniGe*, Mini-Course, Ultrasound Biomedical Imaging: model and applications
- A.A. 2022/23 **Adjunct Professor**, *DICCA-UniGe*, Course, Elements of Mathematics and Geometry for Technical Occupations
- A.A. 2021/22 **Teaching Assistant**, *DIBRIS-UniGe*  
Exercise sessions and teaching support for Algebra and Logics for Informatics course
- Tutoring**
- A.A. 2021/22 **Tutor**, *DIMA-UniGe*, Scientific tutor for high school students at the Mathematics stage giving a lesson on mathematics applications.  
- A.A.2022/23
- A.A. 2022/23 **Tutor**, *DISTAV-UniGe*, Tutor for first year students in Elements of Mathematics Course
- A.A. 2021/22 **Tutor**, *DICCA-UniGe*, Tutor for second year students Mathematical Analysis 2 Course

## Memberships

- 2021-now Gruppo Nazionale per il Calcolo Scientifico - Istituto Nazionale di Alta Matematica (INdAM-GNCS)

## Computer skills

- OS Microsoft Windows, MacOS, Linux
- Programming Python, MATLAB, C++, R, SAS, SQL,  $\LaTeX$
- Experience Office, PostgreSQL, PyTorch

## Languages

- Italian Mother tongue
- English Professional Level

## References

- Federico Benvenuto**, *benvenuto@dim.unige.it*  
Associate Professor, DIMA - University of Genoa