

# Thesis and Stage Opportunities AY23/24

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# The Team

We are 3 faculties, 10 PhD students, 1 Research Assistant... and 20+ MSc students!



*Giacomo Boracchi*



*Luca Magri*



*Federica Arrigoni*



*Filippo Leveni*



*Loris Giulivi*



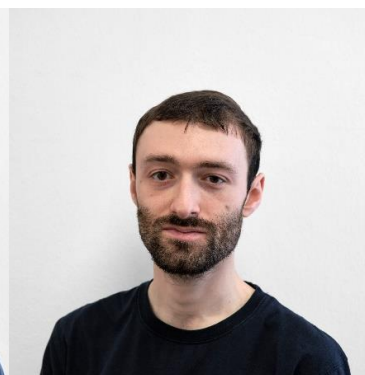
*Antonino Rizzo*



*Michele Craighero*



*Edoardo Peretti*



*Roberto Basla*



*Andrea Porfiri  
Dal Cin*



*Andrea Diecidue*



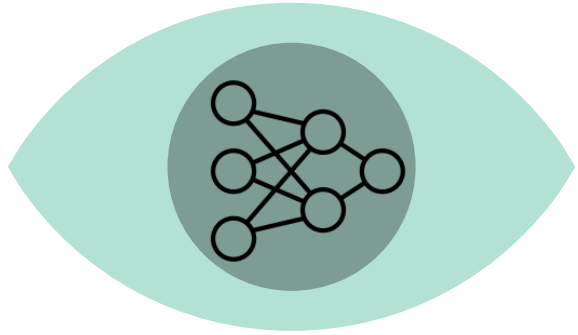
*Olmo Notarianni*



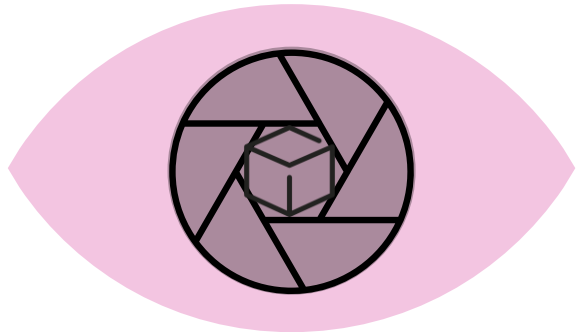
*Rakshith  
Madhavan*



# Our expertise



**Deep Learning for Visual Recognition**

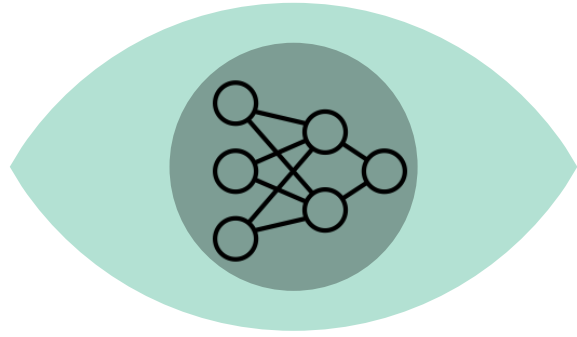


**Computer Vision and Pattern Recognition**



**Image Processing and Analysis**

# Our expertise



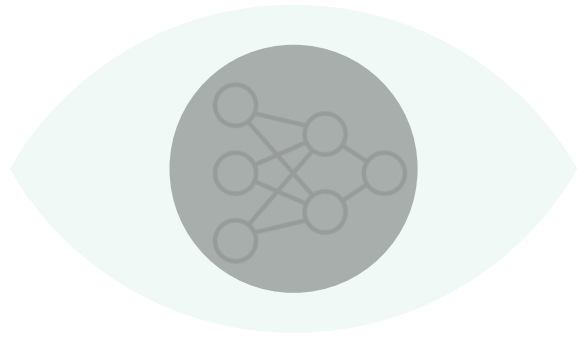
## Deep Learning for Visual Recognition

- Image Classification
- Object Detection
- Image Segmentation, Instance Segmentation
- Anomaly Detection, Open Set Recognition
- Applications to 1D signals and 3D data

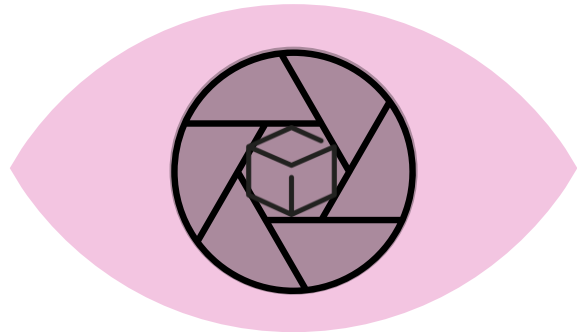


# Our expertise

## Computer Vision and Pattern Recognition



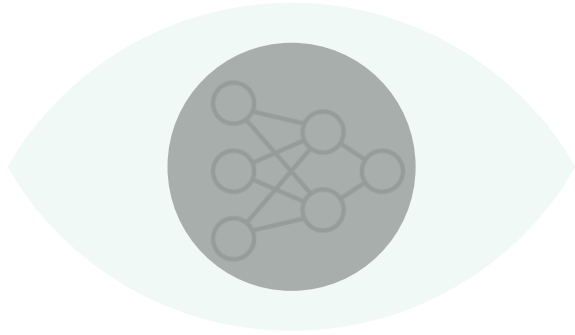
- Multi-View Geometry
- Camera Calibration
- 3D Reconstruction and Localization
- 3D Shape Analysis and Matching
- Robust Model Fitting and Clustering
- 3D Modeling and Rendering
- Quantum Computer Vision



# Our expertise

## Image Processing and Analysis

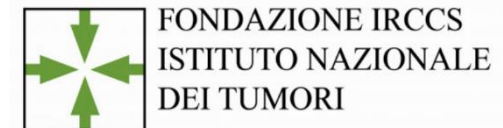
- Statistical Algorithms for Image Analysis
- Template Detection
- Image Denoising and Restoration
- Noise Modelling



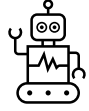
# Research collaboration



ISTITUTO DI RICERCHE  
FARMACOLOGICHE  
MARIO NEGRI · IRCCS



# Our Industrial Reach



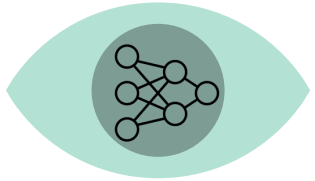
Industry 4.0



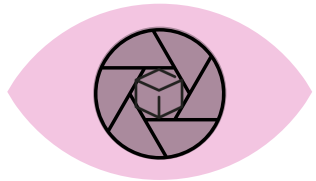
Medical



Security



Deep Learning for  
Visual Recognition



Computer Vision and  
Pattern Recognition



.Cleafy



Image Processing  
and Analysis





Joining us for a Thesis

# Thesis Types

There are three types of thesis

- Academic Research Thesis
- Thesis on research projects
- Internships

Most of our thesis are research thesis. We shoot at a full thesis up to 7 points.

# Academic Research Thesis

Join us to work on a challenging research problem!

We are looking for someone to:

- Continue a research line we have started,
- Investigate new brave ideas,
- Explore a new research challenges and propose new ideas

What you'll do:

*i) brainstorm, ii) read papers, iii) discuss with us, iv) implement codes, v) run experiments, vi) analyze results.*

Iterate the process multiple times.

# Thesis on Research Projects

Help us out in a research project! We often need help in carrying on our project activities. We are looking for someone to:

- Be directly involved in project activities, including meetings.
- Work under our strict supervision.
- Contribute to the project with experiments and reporting.

What you'll do (on top of academic thesis activities): take part / present in project meetings, contribute to reporting and project communications.

# Internship / Research Intership

- These thesis are activated within existing research collaborations with companies / research institutions and typically lead to
  - a full, research-oriented thesis
  - A thesis addressing a very challenging engineering problem
- All these companies are sponsoring PhD Scholarship and/or Industrial Research Projects
- You might be collaborating with other MSc/PhD students currently involved in the same research project
- Internship opportunities are often available and not always mandatory. It is also possible to work to an academic thesis with the project team.

What you'll do (on top of academic thesis): join the research team in the company.

# What we do offer

- Our supervision + co-supervision by a (brilliant) PhD student / colleague of ours
- Our proposals are often meant for thesis  $[-1, 7]$  points, disregarding whether it is academic/project/internship
- An opportunity to learn a new topic and develop solid expertises and skills

# What we do offer

General guidance on «how to address thesis work»

- Thesis management
- How to prepare the Related work
- How to Formulate your Research Problem
- Thesis / Executive Summary Preparation
- Thesis Presentation

Please, have a look here: <https://magrilu.github.io/tht/>

Every now and then we organize meetings to illustrate ongoing research activities

# What we do require

Our MSc students need to:

- Show enthusiasm,
- Be talented and dependable,
- Be rigorous in studying, put special care in analyzing results,
- Have a big sense of initiative,
- Be willing to learn and to brainstorm with us
- Be willing to study papers, not just develop codes,
- Put a constant effort on the thesis work,
- Give frequent and nicely prepared updates
- Expect 9 – 12 months work,



# What we do appreciate

We know this is not always possible... but we prefer

- Meeting in person
- Students taking part to our lab life

# If you feel like a brilliant candidate...

... and you are considering

- Having your thesis work submitted for publication
- Pursuing a PhD related on our research topics...

Just let us know! We will do our best to make sure you will have a clear idea about this after your thesis

# Have a look at our “Thesis hall of fame”

<https://magrilu.github.io/thof/>

You can find executive summaries and thesis slides for students that graduated under our guidance.

.. That webpage is still growing!

# Applying for a Thesis

# What to do now

Check the thesis titles here (link on my website):

<https://docs.google.com/document/d/1gvvQi5jhs72g0ItJ6G2yDkUoxm7ZhwpbMBDPnyTMfBU/edit>

**Come and talk to us** to know about the thesis opportunities you are interested in:

- This is very important for you, you'll make a more informed application to the thesis
- This is very important for us, we might already have an idea on who is the right champion for the thesis!
- Remember to introduce yourself!

# What to do before applying

- Read some material related to the thesis topic
- Write us if you need further information / materials

## The correct mindset:

- Don't worry if there is some background missing. This is rather standard and it's easy to catch up, studying materials we provide. Let us know what your background is, we will consider whether you are suited or not.
- Nobody knows everything about their thesis before starting. This is not like the exam session.
- ... but consider you'll need to know everything about your thesis before graduating 😊.
- Therefore, you need to be interested in your topic, and like the people you'll work with!
- Consider this might be your first (only) research experience.

# How to apply for a thesis

Once you are convinced of doing the thesis with us:

Fill in the form <https://forms.gle/isew6sPHMbBYcWba7>

Remember to tell us:

- Which thesis are you interested in and which are «**first options**»
- What is your background, which courses you have passed that are inherent to the thesis you selected.
- Mention also:
  - any information you deem relevant for working on that specific thesis.
  - successful projects and your programming expertise.
- A short motivation paragraph.

# Deadline to apply for a thesis

**We will start thesis assignment on next Monday 23<sup>rd</sup>.**

To be eligible for a thesis, submit your proposal over the weekend at latest, even though we will start contacting candidates to talk with even this week.

You will receive an email from us to schedule a meeting (possibly in person, but if not possible online) right after the deadline.

Before the deadline, you are welcome to write us email for enquiring

**The form will close on Wednesday 25<sup>th</sup>**



# After having submitted your application

We'll get in touch with you to

- have a meeting
- and (typically later) assign a thesis proposal

We will start from students entering “first options” and having an excellent match with our expectation

Thesis work is expected to start in early October with a “general meeting”, even though you might start studying before that date.

# Thesis List

# Overall

There are quite a few thesis proposals

- 8 Thesis on Deep Learning (not necessarily on vision)
- 5 Thesis on Medical / Biomedical Imaging
- 2 Thesis on Image Processing for Emerging Sensors
- 5 Thesis on Computer Vision
- 2 Internship opportunities

**We are not going to open more than 10-15 thesis (we couldn't make it!),  
only thesis with motivated and brilliant candidates will be activated.**