Oxford Machine Learning in NeuroImaging Lab

Lab Handbook

1 Welcome

Welcome to the Oxford Machine Learning in Neuroimaging (OMNI) Lab! We are a team of researchers led by Ana Namburete based at the Department of Computer Science at the University of Oxford. We wrote this document to provide all new members of the OMNI Lab have insight into how our group operates and ensure that you have a great time working in the lab. In this handbook, you will find detailed information about life as a member of the OMNI Lab, what we expect from our researchers, and the support we can offer to your professional development.

We hope this document serves as a reference point throughout your time at OMNI, providing you with the necessary information for an overall positive social and professional experience during your time here. We expect all new members to read this document by the end of their **first month** after joining our lab.

The guidelines described are constantly evolving according to the needs of the group. If you are currently a member of the lab, we encourage you to provide suggestions or modifications to the handbook. For any questions or concerns, you may directly contact Ana or post a message in the relevant communication channels of the lab (e.g. on Slack, or raise it in our weekly group meetings).

The current manual has been inspired by the work of our colleagues and collaborators (Benjamin Tendler, the WIN Physics group). We are grateful for their support.

– The OMNI Team

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2 Science and Mission

The **Oxford Machine Learning in NeuroImaging (OMNI) Lab** develops reliable, data-efficient machine learning tools to advance medical image analysis— particularly in settings where data, annotations, or computational resources may be limited. We value openness, interdisciplinary collaboration, and practical impact, creating a supportive environment for learning, discovery, and innovation.

We work at the intersection of imaging, artificial intelligence, and healthcare, focusing especially on brain development across the lifespan. From constructing the first normative atlas of fetal brain maturation using ultrasound, to developing biomarkers of brain ageing, our work aims to deepen our understanding of human neurodevelopment and help clinicians identify atypical developmental trajectories earlier and more accurately.

A core strength of our group lies in developing innovative methods— from few-shot and self-supervised segmentation techniques, to models that ensure anatomical plausibility and clinical interpretability. We also pioneer technologies that enhance ultrasound image acquisition, reconstruction, and localisation, making advanced imaging analysis accessible worldwide.

Equity and reproducibility underpin our scientific mission. Our harmonisation tools enable large-scale analyses across diverse imaging datasets, sites, and scanners, preserving privacy and biological integrity. We aim to ensure that AI-driven healthcare solutions work effectively for all—not just under ideal conditions.

As an open, collaborative, and supportive community, we actively mentor lab members to become leaders in research and clinical innovation. By creating practical, rigorous tools and sharing them openly, we strive to support current and future generations working at the exciting intersection of AI and healthcare.

For more information regarding the research carried out at the lab, please visit the website.

3 Research Roles and Expectations

This section outlines how we run the lab, approach science, and interact with one another. Our goal is to foster a positive, stimulating, and rewarding environment. Active participation from every member is essential for achieving these goals.

3.0.1 General Expectations

- **Follow your passion.** Engage in projects you are proud of and contribute work that matters.
- **Value precision.** Science requires accuracy. Take your time, check your work carefully, and pay attention to detail.
- **Acknowledge and correct mistakes.** Mistakes are part of the scientific process. If errors occur, communicate them promptly to collaborators, especially if results are being written up, submitted, or published. We learn and progress together.
- **Maintain integrity.** Our success depends on honesty. Never plagiarise, falsify, cherry-pick, or omit data. Null and unexpected results are still valuable. Upholding academic integrity is non-negotiable.
- **Support your lab mates.** Science thrives on collaboration. Offer help when you can, and expect to receive help in return. We are a team!
- **Balance independence with openness.** Work independently where possible, but do not be afraid to ask for help. Check this handbook or the lab Wiki first; they may already have the answers you need.
- **Share knowledge.** Mentorship takes many forms, so contribute to a culture of learning.
- **Respect differences.** Value each other's strengths, weaknesses, backgrounds, and beliefs. Communicate openly and with respect, both professionally and personally.
- **Prioritise well-being.** If you encounter challenges, reach out to Ana, or if you prefer, use University services. *Your well-being is a priority*, and your health and happiness matter to the lab. See the section *Work and Wellbeing* for more resources.
- **Sustain your science.** Research is a marathon, not a sprint. Take personal time and holidays when needed, and maintain a life outside the lab. Respect that others do the same.

Example MPLS Graduate Studies email

Figure 1: Example MPLS Graduate Studies email

3.1 Research Students

Role
Research students include those pursuing a degree (Masters, DPhil) or visiting students working on a research project.

Day-to-day
Students are responsible for much of the research in our group. MSc and DPhil students are engaged in one- or three-year trajectories towards a thesis supervised by the PI, sometimes with additional input from collaborators. Their primary task is to advance their own research project (e.g. reading literature, designing and running experiments), but they also contribute to broader "research-adjacent" work.

A typical week may include:
- algorithm development
- experimental work
- supervision meetings
- one-to-ones with group members
- general lab meetings
- educational or training activities

Support for students
Students are trained professionals and their ideas should be taken seriously. They can expect to meet their supervisors regularly in a supportive environment and should feel empowered to ask questions, admit when they do not understand something, and respectfully point out mistakes. Supervisors will provide regular feedback and encourage students to develop their own ideas to progress their projects.

Expectations of students
Students are an integral part of the lab and often contribute to the group's functioning beyond their own projects. They are expected to:
- provide regular progress updates in supervision meetings
- actively participate in lab activities (e.g. group meetings, joint reading groups)
- supervise junior students (if there is an appropriate match in terms of topic and schedule availability) - meet Oxford's formal requirements for their degree (e.g. Transfer of Status, Confirmation of Status, mandatory graduate events, and skills training)

It is the student's responsibility to fulfil Oxford's requirements for their degree. This entails monitoring the deadlines for checkpoints relating to their progression (e.g., Transfer of Status and Confirmation of Status), taking part in (mandatory) graduate events, and engaging in skills training.

Students should recognise that their research is a form of training and that challenges and setbacks are part of the learning process. General information on the expectations can be found here. It is also advisable to save and print the email from MPLS Graduate Studies with your requirement deadlines (see example below).

Challenges
Navigating a first major research project is a difficult task. To be successful, students must also develop "soft skills" including effective communication and time management. Unexpected difficulties are part of the research process, e.g., learning how to cope with setbacks takes ex-

perience, fortitude, and patience. These stressors can be exacerbated by additional factors throughout the degree, including the isolation of leading a research project, difficulty navigating work-life balance, and distance from long-standing support networks. The OMNI Lab frequently organizes (optional) social activities that encourage non-academic interaction amongst lab members (see Slack's `#social` channel).

3.2 Early Career Researcher

Role
Postdoctoral researchers, associate members, and junior research fellows.

Day-to-day
The ECR stage marks a transition towards greater independence. The term "ECR" refers to the academic position held after completing a DPhil/PhD and before securing a faculty role (e.g. assistant, associate, or full professor).

ECRs spend most of their time developing their own line of research while also collaborating on a wider range of projects. Postdoctoral researchers usually lead their own research, which may involve processing and analysing new data, as well as developing solutions to emerging research questions. Depending on needs and funding (as agreed with the PI), their work may be supported by Research Assistants or short-term project students.

ECRs may supervise other lab members (e.g. postdocs, PhD candidates, MSc internship students, and rotation students), where there is an appropriate match in topic and availability. Supervision can range from day-to-day guidance to focused support on a specific part of a project and should be clearly discussed at the outset.

Beyond research, ECRs often take on additional responsibilities, such as committee work, student supervision, outreach, and teaching. They may also be asked to stand in for Ana when required, and to help with or lead grant applications.

Support for ECRs
ECRs can expect Ana and senior group members to dedicate time to their career development, offering both practical advice and feedback on progress. Senior members can also help create opportunities for ECRs to assume more responsibility, grow independence, and engage with the wider research community.

Where ECRs provide supervision, students should take their guidance seriously, respect the demands on their time, and ensure contributions receive proper credit (e.g. co-authorship).

Expectations of ECRs
Having recently completed doctoral training themselves, ECRs are well placed to support students' career development. They often have more time than senior group members (e.g. the PI) to provide guidance, advocate on students' behalf, and help identify appropriate contacts when issues arise.

Ana can expect ECRs to share their expertise within the group and externally (e.g. at conferences), support students with constructive feedback, and participate actively in lab life. This includes attending group meetings, contributing to journal clubs, and joining other relevant meetings (e.g. VGG or OxCIN Analysis Reading Group).

Challenges
Transitioning to increased independence—whether pursuing an academic career or moving into industry—brings considerable responsibility. This stage often involves moving between research groups and/or changing research topics, which requires adjustment.

ECR positions are inherently transitional and often coincide with increasing personal commitments (e.g. starting a family) and the need to apply for grants, fellowships, or jobs. Balancing a diverse workload, the uncertainty of fixed-term contracts, and reduced supervisory support can be challenging.

3.3 Principal Investigator

Role
Ana Namburete is the PI for the OMNI Lab.

Day-to-day
Teaching and research are central to Ana's role. She shapes the lab's scientific vision and contributes to research projects through supervision and collaboration, often directing several projects in parallel. Alongside this, she manages numerous responsibilities beyond research, including committee work, lab logistics, leadership in large-scale initiatives, grant applications, article reviews, examinations (doctoral vivas), and teaching within both the department and the college.

Her schedule is highly varied: she may shift context multiple times within a day and frequently spends entire workdays in meetings across a wide range of topics.

Support for the PI
Students and ECRs can support Ana by reliably completing agreed tasks. It helps to distinguish which decisions require her input and which can be made independently. Flexibility with scheduling is valuable given her competing demands. Understanding her communication style also fosters an effective working relationship.

Expectations of the PI
Ana provides academic and personal support, along with clear communication of expectations. She contributes actively to ongoing research by offering guidance and mentorship to students and ECRs, typically through regular supervision meetings. These meetings occur weekly, bi-weekly, or *ad hoc* depending on needs, but no less than once per month, and usually last 30–60 minutes. When booking, consider how much time is truly needed. There is no obligation to fill the hour.

Ana offers mentorship on a wide range of research and career topics and often advocates for junior researchers, acting as a "sponsor" when opportunities for advancement arise. She also supports group members during career transitions, whether within academia or beyond.

Challenges
Ana's workload is extensive, requiring the management of diverse situations, decision-making that affects the lab, and frequent responses to internal and external communications. To work effectively together:
- Distinguish when her input is essential.
- Provide advance notice for scheduling.
- Come prepared for topic-specific meetings (e.g. with slides) to maximise their usefulness.
- Use clear deadlines and timely reminders as final dates approach.

During term time, Ana also teaches and supports a cohort of >20 undergraduate and MSc students at her College. She typically receives more than 30 emails per day and sends nearly as many. Short, concise emails are easiest to handle, and brief replies reflect efficiency rather than criticism. On occasion, Ana may send emails at irregular hours, but there is no expectation to respond outside your own working hours.

Delays or oversights are often the result of navigating competing priorities rather than carelessness. Nonetheless, Ana remains open to feedback and discussion about how to improve group management.

3.4 Internal Science Roles

Within the OMNI Lab, a variety of service roles are essential to maintaining a lively and stimulating environment. These roles support the organisation of digital resources and group activities. Taking on a service role is not only important for the smooth running of the lab but also provides valuable opportunities to develop leadership, teamwork, and organisational skills that will benefit your future career.

By sharing the workload, we can prevent responsibilities from falling disproportionately on a few individuals and ensure tasks are allocated according to each researcher's skills and commitments.

Service roles are held for one academic year (September–August).

Examples of service roles include:
- Organisation of group meetings
- Organisation of the joint Medical Imaging Reading Group
- "Away Day" planning
- Social activities (e.g. drinks, dinners, excursions, meetings with other groups)
- Website and lab handbook maintenance
- Computing cluster maintenance

Some roles require more effort and may be shared by multiple researchers. If you are interested in a particular role, please let Ana know.

If at any point your responsibilities create a disproportionate strain on your primary research, please discuss this with Ana.

4 Culture

4.1 Work and Wellbeing

4.2 Equality, Diversity, and Inclusion

4.3 Good Citizenship

5 Development

5.1 Career Development

5.2 Open & Responsible Research

5.3 Responsible usage of AI for Research

5.4 Collaborating

5.5 Travel & Conferences

5.6 Public Engagement