

Working at the Hen Lab

The Hen-Lab at MIT is focused on advancing our understanding of QCD effects in the nuclear medium to better our understanding of nuclear interactions and the parton structure of nuclei. Our research involves conducting measurements of high-energy electron scattering and photoproduction processes at Jefferson Lab, neutrino scattering at Fermilab, and hadronic reactions with radioactive beams at GSI. We are also actively involved in the development of the new Electron-Ion Collider (EIC) at Brookhaven National Lab. Additionally, we operate a detector R&D lab on campus that supports hardware development for experiments at different accelerator facilities.

Our group consists of 4-6 graduate students, several postdocs, and undergraduate researchers. Our main goals are to push the boundaries of nuclear physics and nurture the next generation of leading researchers in the field. We also strive to create a work culture that promotes fun and excitement in our research endeavors.

This document is a personal statement from Or, the group's PI, to both current and prospective group members. Its main purpose is to define the expected work culture and formal procedures that guide our research activities.

Graduate work:

- Thesis scope. Graduate theses typically revolve around a well-defined experimental project. In most cases, the project will focus on the analysis of data obtained from experiments we conduct at particle accelerators worldwide. Students usually choose their "main project" during their second year of studies in consultation with me. While project complexity and timelines vary, we aim to identify a "safe core" of work that can be accomplished within a 6-year Ph.D. timeline, assuming a 60% dedication of the student's full-time effort. Completing this core work is sufficient for a graduate thesis

The remaining 40% of a student's effort is devoted to exploratory and/or high-risk high-reward projects. These projects could involve simulation and/or hardware work for future experiments, phenomenology studies, or extensions of the core experimental work. These projects contribute to the student's scientific training and help develop an extended "scientific toolkit." While including these projects in one's graduate thesis can improve its quality and scientific breadth, they are not traditionally required for graduation.

It is natural that in the first years of one's graduate studies will emphasize the 'exploratory' 40%, while the later years will be focus more on the core 60%, thesis writing etc.

- Timeline. MIT physics students typically graduate within 6 years of starting their graduate program. This takes into account the fact that most students spend their first year primarily focused on academic work. A typical standard deviation of 1 year on this 6-year average is

not uncommon. Your graduation timeline will depend primarily on your own work, but external factors such as accelerator schedules and unexpected results can impact your progress. If you have concerns about your graduation timeline, please discuss them early and openly during yearly reviews and 1:1 meetings.

- Location. Our experimental work is typically conducted at Jefferson Lab (VA), Brookhaven National Lab (NY), Fermilab (IL), GSI (Germany), and other accelerator facilities. Working closely with lab staff is often the most effective way to make progress on experimental work, particularly concerning technical data analysis. Therefore, it is common for group members to relocate to the lab most relevant for their work for a period of 2-3 years.
- Teaching. Graduate students in our group often serve as teaching assistants (TAs) for one or two semesters during their tenure in grad school. The extent of TA work can vary depending on the group's financial situation, ranging from a formal requirement to a group preference that can be opted out of. If you wish to teach more or less than requested, please bring it up during our 1:1 meeting.
- Undergraduate Mentoring. Collaboration with undergraduate students through the MIT UROP program is a privilege we enjoy. I strongly encourage you to identify suitable research projects that can benefit from the assistance of undergraduate researchers and discuss them with me.

In thinking about undergraduate mentoring, please keep in mind that:

- Undergraduate mentoring is a rewarding experience, but it is also a two-way commitment. The undergraduate student commits to working with you under agreed-upon effort levels, and in return, you commit to dedicating time to teach them what they need to know, support them when they face challenges, and work with them on technical reports and presentations. Mentoring can be demanding, so make sure you have enough time available before entering into a mentorship relationship. While I will provide support, routine interactions will typically occur directly between you and the student.

Facilitating collaboration with undergraduates is a priority for our group. If you want to mentor a student but feel you don't have enough time, please discuss it with me so we can find ways to allocate the required time for this effort.

- Good mentoring is a skill that develops over time. I encourage group members to start developing these skills early on. I will provide mentoring advice as your work progresses. If you are interested in mentoring but unsure about your abilities, please bring it up during our 1:1 meeting for discussion.
- Yearly Review. Inspired by MIT's 'Annual Development Review' process for postdocs, we conduct an annual review for students in May. This process aims to facilitate open conversations about our shared expectations for your work, assess progress, discuss your

experience in the group, address graduation timelines, and learn about your career goals and how I can assist you in achieving them.

- Academic advisor and graduate students advocator. Your academic advisor and the Physics Department graduate student advocator play central roles in our department. They can provide external and unbiased perspectives on issues that arise and act as discussion facilitators to help resolve challenging matters within research groups. If you need to discuss issues that you don't feel comfortable discussing with me directly, I strongly encourage you to reach out to either of them.

Postgraduate work:

- Role in the group. Postgraduate researchers are integral members of the group. As experienced researchers, group postdocs function as "non-formal PIs" for their projects and co-mentors for the graduate students they work with. While you will receive constant support, you will eventually assume most of the responsibility for the success and development of your research program. This offers ample opportunities to demonstrate your skills as an independent researcher and your ability to advance your work.

The group as a whole and I personally am highly committed to your success and helping you realize your career goals, whatever those may be.

- Projects assignments. Postdocs are typically assigned well-defined projects that they lead. This assignment is determined either before or shortly after joining the group. Depending on the project's scale, more than one postdoc may be involved, ensuring each postdoc has a unique scientific area of responsibility.
- Student mentoring. Group postdocs are expected to work closely with graduate students collaborating on their projects. This includes both technical and scientific mentoring. On the technical side, you should adopt a hands-on approach, helping students master new skills and collaboratively finding solutions to problems they encounter. On the scientific side, you are responsible for steering the project's scientific development and maximizing its timely output and impact.
- External work. It is common for postdocs to join the group with a few open projects they wish to conclude from their Ph.D. work. As you develop an independent research program, you may also want your portfolio to include topics beyond the group's interests, which will require additional time and effort. We are happy to allocate ~ 20% - 30% of each postdoc's time in support of promoting such "independent" projects.
- Teaching. Unless faced with funding challenges, we do not usually expect postdocs to work as TAs. However, it is still possible for you to gain teaching experience if you're interested. Please let me know so we can explore the possibilities.
- Undergraduate Mentoring. I strongly encourage you to mentor undergraduate student research projects through the MIT UROP program, either individually or jointly with a graduate student. Please refer to the discussion under the "Graduate Work" section for more information.

- Yearly Review. MIT's postdoc appointment renewal process includes an 'Annual Development Review' in May. This process is significant in our group and aims to facilitate open conversations about our shared expectations for your work, assess progress, discuss your experience in the group, and learn about your career goals and how I can support you.

Workload expectations:

- Work hours. Working in the group is equivalent to holding a full-time industry job, which typically involves around 40 hours per week. Group members are expected to spend the majority of their workday in the office.
- Time Off. MIT offers various forms of time off, many of which are paid. This includes institutional holidays, personal vacations, and leaves for specific situations such as Sick Leave, Parental Leave, and family leave. The specific time off policies and entitlements can vary, so I encourage all group members to familiarize themselves with the relevant MIT policies either by reviewing them online or contacting HR. I also encourage you to *fully utilize* your allotted vacation time throughout the year.

Please inform me of your time-off plans as soon as possible, at least two weeks in advance, so we can plan group activities accordingly.

- Unconventional working hours / circumstances. Due to the nature of our work, there may be times when unconventional working hours are necessary on a temporary basis. This can include working extended hours to resolve issues in real-time during experiments or taking experiment monitoring shifts on nights and weekends. Shift work for experiments usually involves taking 3 - 4 day blocks, with one 8-10 hour shift per day once or twice a year. Additionally, the group runs its own experiments for about a month once a year, requiring a significant leadership role and more time spent at the lab compared to regular shift work. These non-conventional work hours are temporary and typically planned well in advance. We strive to acknowledge the effort required by providing reduced workloads before or after such periods.
- Work/life balance. If you feel overloaded, I encourage you to discuss it with me. Maintaining a healthy work/life balance is important, and we can work together to find solutions.

Meetings:

- Project meetings. Our work is collaborative, and we typically have weekly project meetings with colleagues from inside and outside MIT. These meetings provide opportunities to discuss recent progress and plan our path forward.
- Weekly 1:1 meeting with Or. This meeting is dedicated to you, and you decide the agenda. It's a good opportunity to address any issues that may not be appropriate for larger project meetings or discuss professional matters you prefer to discuss privately. The meeting is scheduled for 30 minutes, but it's okay if you decide on an agenda that does not use the entire time. We can also schedule longer meetings in advance if needed.

- Weekly group meeting. The group holds a weekly meeting to discuss issues of common interest and allow group members to become familiar with each other's work. The meeting rotates between "round-table" meetings, where members give short presentations on their recent work, and "focused" meetings, where one member presents a longer talk (~30-40 minutes) on their work. These longer talks also serve as a professional development opportunity, providing feedback on presentation skills.

The organization of the group meeting is handled by our admin assistant, Elysse Galarza (egalarza@mit.edu). Please do your best to sign up for presentations when contacted by Elysse. If you're unsure about what to talk about, you can bring it up during our 1:1 meeting.

- Seminars and colloquia. Holding a broad view of the field is crucial for our success as researchers. Therefore, group members are expected to attend the weekly LNS lunchtime seminar and colloquium and actively participate in the HPG journal club. Additionally, we strongly encourage attendance at the weekly Physics Department colloquium.
- Non-formal meetings & direct communication. My calendar is available online (<https://www.hen-lab.com/internal>). Feel free to drop by my office when I'm not in a meeting. You can also contact me anytime via email, Skype (orchen21), or Slack. I strive to respond promptly, but please note that my response outside normal working hours does not imply an expectation for you to do the same.

Work-related Travel:

Group members often have the opportunity to travel nationally and internationally as part of their work. This includes participating in experiments, collaboration meetings, and conferences. While traveling can be enjoyable, it is not always strictly required. When travel is necessary, we follow MIT procedures to ensure all aspects are covered.

- Travel planning and booking. The group follows travel regulations set forth by MIT policy and the funding agency supporting the trip. Before organizing your trips, it is important to consult with the LNS travel coordinator (Lauren Saragosa, saragosa@mit.edu) and our group admin (Elysse Galarza, egalarza@mit.edu). They will guide you through the booking and reimbursement processes.
- General travel expenses. We typically cover per diem, flight costs, hotel accommodation, and transportation expenses. Transportation needs vary depending on the destination, so it's essential to discuss your plans with me in advance. Sharing hotel rooms with other group members may be required in some cases. If you find the per diem amount insufficient, please discuss it with me to ensure it covers your local expenses.
- Out-front and out-of-pocket expenses. While it is possible to pay for your travel expenses in advance and get reimbursed upon return, it is not strictly required. Lauren and/or Elysse can use their MIT credit cards to pay for your flight, hotel, and other reservations in advance. Additionally, you can apply for an MIT cash card to access your per diem funds during the trip. If interested, please contact Lauren and Elysse well in advance of your trip.

- Extended support. We are committed to supporting increased financial costs and other personal challenges that may arise from work-related travel, as allowed by MIT. This includes providing child care expenditures or funding for a family member to join the trip, depending on the circumstances. If applicable, please contact Elysse, Lauren, or myself to discuss the type of support that can be provided within the guidelines of our funding sources and MIT regulations.
- Reimbursements: According to MIT policy, reimbursement for travel expenses paid out of pocket will only be processed after returning from the trip. To minimize reimbursement amounts and streamline the process, it is advisable to make reservations with Lauren's assistance.
- Conference attendance. We typically try to send each group member to one conference per year within the U.S. and to an international conference every other year. This is not strictly required and, pending budgetary constraints, we prioritize sending group members who received a formal talk invitation and/or are close to finishing their tenure with the group and need the visibility to help advance to the next stage of their career.

Group members are asked to let me know when receiving a formal talk invitation (even if the topic is outside the work done in the group), and if they notice a conference they believe they would strongly benefit by attending. I will do my best to facilitate it.

- Medical Coverage. Group members are *required* to discuss with LNS admins before their trip to ensure they have proper medical coverage and that they know what to do in case they need medical attention during their trip. A general rule is that if you don't know what to do if you fall and break your leg, you have not completed the preparations for your trip.
- Power connectors. We keep universal power adapters and compact USB-A and USB-C chargers for travel in my office. If you need them, feel free to borrow these items before your trip.

Conduct and procedures:

- Collegiality. Collaboration and collegiality are essential for our group's success. We must proactively share knowledge, provide scientific feedback, and maintain respect for each other.
- Presentation Reviews. Delivering clear and engaging scientific presentations is a crucial skill, and group members giving talks should circulate their slides to the group for feedback. Consult with senior personnel about the need for a practice talk, which should be scheduled at least two days in advance of the talk.
 - Preliminary data and draft publications. We value transparency and collaboration with colleagues outside the group. However, sharing non-public information such as preliminary results and findings or publication drafts requires my explicit permission. Please refrain from sharing such information without consulting me first.

- Archiving. To ensure easy access to information, all talks should be uploaded in their original form (e.g., ppt or keynote) as well as PDF format to the group docDB. When writing a paper, lead authors must add high-quality (i.e., vector graphic PDFs) versions of all figures associated with the paper to the group figure repository.
- Code writing. If you will be using code for an extended period, such as more than two weeks, we ask that you keep it version-controlled with git and back it up on GitHub. Your GitHub repositories should be kept private by default, and we can decide to make them public later when necessary. Commonly used software tools that benefit many group members should be added to the henlab git repository.

Communication / Software tools:

The group uses various software tools in our day-to-day work, including:

- Group slack workspace (<https://mit-src.slack.com>)
- Internal web-page (<https://www.hen-lab.com/internal>)
- Group docDB (<https://docdb.lns.mit.edu/henlab>)
- Group and collaboration-specific mailing lists

New group members should make sure to discuss with Or how to open the relevant accounts and be added to the appropriate mailing list.

Funding:

- Base and external funding. In accordance with LNS and Physics Department policies, we make hires only when funding is already secured or highly likely to be secured. External funding sources, such as fellowships, can complement our resources and provide additional support for conferences and hardware needs. At the same time, we stress that **we treat all group members equally, regardless of their funding source.**

Group members are strongly encouraged to apply for external funding as available and appropriate and I am always happy to provide reference letters for your applications. There are many opportunities for securing external funding via applications to the NSF, JSA, URA, CFNS and others. Conferences often also offer fellowships that wave registration fees and/or help fund part of your travel and/or local expenses.

Publication Authorship:

We strive to promote the efforts of students and postdocs as much as possible when it comes to authorship on group publications. In most cases, authorship rights and the ordering of author names are determined based on the work performed. However, there may be special cases that require my decision, taking various considerations into account. I promise to be transparent about these decisions and their reasoning, and by joining the group, you agree to accept my final decision on authorship matters.

General procedures:

As part of the MIT Physics Department and Laboratory for Nuclear Science (LNS), we adhere to procedures outlined by both departments, in addition to general MIT guidelines. It is strongly encouraged for group members to familiarize themselves with these procedures by reviewing the "Services & Resources" section of the LNS website

(<https://web.mit.edu/lms/>) and the "Policies and Procedures" section of the Physics Department website (<https://physics.mit.edu/about-physics/policies-and-procedures/>).

Graduate Students Annual Development Review Template:
(Developed by Or in consultation with group members)

Student Name:	Year in Ph.D program:
PI Name: Or Hen	Year with the group:
Thesis topic:	Review date:

To be filled by the student:

1. Briefly describe the main project(s) you worked on in the past year. What is the central progress and/or key achievements made on each project during the past year?
2. Describe, in broad terms, your current work plan for the coming year.
3. Describe your career goals, along with a rough timetable. Have these changed during the last year?
4. What progress have you made towards your career goals? Do you feel that you are making sufficient progress towards these goals?
5. Do you feel there has been any impediment towards your project(s) or career goals? is there any support from the PI/group that you wanted but felt wasn't available, or would like to see in the future?
6. Do you feel comfortable working with the group? Are you satisfied with the work culture and group bonding activities?
7. Describe any other issues you would like to discuss with your PI.

