

Working at the Hen Lab

The Hen-Lab at MIT focuses on the study of QCD effects in the nuclear medium, and the interplay between partonic and nucleonic degrees of freedom in nuclei, and lepton-nucleus interactions for precision neutrino-oscillation measurements. To this end, we perform measurements of high-energy electron and photon scattering processes at Jefferson-Lab, neutrino scattering at Fermilab, radioactive beam reactions at GSI and are helping to develop the new Electron-Ion collider at Brookhaven National Lab. In addition, we operate a detector R&D lab on campus which supports the development of hardware for experiments at the different accelerator facilities.

The group typically include 4 – 6 graduate students, several postdocs, and MIT undergraduate researchers (via the UROP program). Our overarching goals are to constantly push the boundaries of our field while training the next generation of top nuclear-physics researchers, and have fun doing so!

This (still evolving) document is a personal statement from Or (the group's PI) to existing and perspective group members, to define the expected work culture and formal work procedures when working with the group.

Graduate work:

- Thesis scope. Graduate theses in our group are generally centered around a well-defined experimental project. Specifically, most projects in the group are focused on data-analysis from experiments at particle accelerators. Students typically choose a specific project to focus on during the second year of their studies and in consultation with Or. While projects complexity and timelines vary, we strive to identify a 'safe core' of work that is highly probable to be achieved within a 6-year Ph.D. timeline, and assuming dedication of 60% of the student's full-time effort. The completion of this core work is the sufficient basis for a graduate thesis.

The other 40% of a student's effort are kept for more exploratory and/or high-risk high-reward projects that the student is interested in. Examples include simulation and/or hardware work for future experiments, phenomenology studies, or even extensions of the core experimental work. These projects contribute to your training as a scientist and help develop your "scientific toolkit". If converged, the inclusion of such projects in a graduate thesis help increase its quality and expand its scientific breath. At the same time, the successful completion of these projects is not traditionally required for graduation.

It is natural that in the first years of your graduate work you will focus more on the 'exploratory' 40% and the later years will be more focused at the core 60%, thesis writing etc.

- Timeline. MIT physics students graduate on average within 6 years of starting the graduate program. This accounts for the fact that most students spend their first year focused almost exclusively on academic work, and a typical standard deviation of 1 year on the 6 years average is not uncommon. Your graduation timeline depends primarily on your own work and, sometimes, also on external factors such as accelerator schedule and performance. Research work is not 100% predictable, and it is therefore important that we discuss early

and openly when students feel concerned about their graduation timeline (see yearly reviews and 1:1 meeting below).

- Location. The group's experimental work is typically carried out at accelerator facilities around the world, such as in Jefferson-Lab, Brookhaven National Lab, Fermilab, GSI and others. Working closely with lab staff is typically the best way to make rapid progress on experimental work, especially when it comes to technical data-analysis aspects. It is therefore typical for group members to relocate to the lab for at least 2-3 years.
- Teaching. Graduate students in our group often TA for one or two semesters during their tenure in grad school. Depending on group's financial situation this can change from a preference of the group to a formal requirement. Students who wish to teach more (or less) should discuss it with Or.
- Undergraduate Mentoring. Being at MIT, we are privileged to collaborate with remarkable undergraduate students, who are usually eager to do research with us via the MIT UROP program. You are strongly encouraged to identify suitable research projects that can benefit from the help of an undergraduate researcher and contact Or to discuss it.

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

- While undergraduate mentoring is a fun and highly recommended experience, it is also a two-way commitment. The undergraduate student commits to working with you, under an agreed upon effort level, and you commit to putting in the time to teach them what they need to know, help them when they get stuck, work with them on preparing technical reports / presentations of their results etc. You should therefore only enter into a mentorship relation with a student if you are convinced you have the time to work with them and provide them with proper mentoring. I will help as best as I can, but routine interactions will usually take place directly between you and the student. If you want to mentor a student but don't feel you have the time to do so, please discuss it with Or so we can find a way to free up some time for this.
 - Good mentoring is a skill that develops over time. Group members are encouraged to start developing this skill early on, and will receive mentoring advice from Or as your work progresses. If you are interested in mentoring but unsure of your abilities to successfully do so, please consider bringing it up for discussion in a 1:1 meeting with Or.
- Yearly Review. Inspired by MIT's 'Annual Development Review' process for postdocs, we hold an annual review for students during the month of May. The goal of this process is to facilitate an open conversation on our shared expectation for your work, discuss how you and I each see your progress towards meeting these expectations, how you feel working in the group, expected graduation timeline, and to inform me on your career goals and ways in which I can help you realize them.
 - Academic advisor and graduate students advocator. Your academic advisor and the Physics Department graduate students advocator both play central roles in our department. Among others, they can provide external and unbiased perspective on issues that come up, and serve as 'discussion facilitators' to help resolve such issues that are challenging to handle,

or even bring up, within the research groups. You are strongly encouraged to reach out to either of them if you need to discuss issues that you do not feel comfortable discussing with me directly.

Postgraduate work:

- Role in the group. Postgraduate researchers are key members of the group. As experienced researchers, group postdocs in the group grow to function as independent ‘non-formal PIs’ for their projects and co-mentors for the graduate students they work with. While receiving constant support, you will eventually carry most of the responsibility for the success and development of your research program and thereby receive ample opportunities to develop and demonstrate your skills as an independent researcher and your ability to continue and expand your work as an independent researcher.

The group is 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 can lead. This assignment is done either before or right after joining the group. Depending on the scale of the project, there could be more than one postdoc involved. We always make sure that each postdoc has a unique scientific area of responsibility.
- Student mentoring. Group postdocs are expected to work very closely with graduate students who collaborate on their projects. This include both technical and scientific mentoring. On the technical side, you are expected to keep a ‘hands-on’ approach and help students master new skills and find solutions together to problems they encounter. On the scientific side you are also expected to co-steer the project’s scientific development and help ensure we maximize its timely scientific output and impact.
- External work. It is not uncommon for postdocs to join the group with a few open projects they wish to conclude from their Ph.D. work. At later times, as you start developing an independent research program, you might wish for it to include topics that extend beyond the interests of the group, which will also require your time and effort. It is therefore standard for postdocs to invest an average of 20% – 30% of their time on “independent” projects that do not correlate with the group’s research program.
- Teaching. Unless faced with funding challenges, we do not usually expect for Postdocs to work as TAs. At the same time, this practice does not mean it is not possible for you to do so. If you are interested in gaining teaching experience please contact Or.
- Undergraduate Mentoring. You are strongly encouraged to mentor undergraduate student research projects via the MIT UROP program, either directly or jointly with a graduate student. See discussion under “Graduate work” section above.
- Yearly Review. MIT procedure for postdoc appointment renewal include an ‘Annual Development Review’ process that takes place during the month of May. This process is taken very seriously in our group and is used as a mean to facilitate an open conversation

on our shared expectation for your work, discuss how you and I each see your progress towards realizing those expectations, how you feel working in the group, and inform me on your career goals and ways in which I can help you realize them.

Workload expectations:

- Work hours. Working in the group is equivalent to holding a full-time industry job (i.e. ~40 hours/week). Group members are thus expected to spend the majority of the work day in the office.
- Time Off. MIT offers various kinds of time off, most of which are paid. Most common forms of time-off include institutional holidays (see list [here](#)) and personal vacations. In addition, MIT policies supports a range of leaves that might be appropriate to employ depending on one's specific situation. These include, among others, Sick Leave, Parental Leave, and family leave.

Vacation time is defined by MIT, and may vary depending on one's specific position. We ask that all group members familiar themselves with the MIT policies relevant for them (by reviewing online and/or contacting HR). We further ask of all group members to make *full use* of their allotted vacation time during the year.

When possible and appropriate, it is appreciated if group members let Or know of their time-off plans at least two weeks in advance to help plan group activities accordingly.

- Unconventional working hours / circumstances. The nature of our work sometimes requires unconventional working hours, on a temporary basis. The most typical scenario is that of shift taking on experiments. Our experiments are usually "single shot" (no do-overs if things don't work) and run 24/7. Therefore, running on such an experiment can require working for extended hours if an issue needs to be resolved in real time, and/or working on nights and weekends. Under typical circumstances every year you would take about two "shift blocks" that are each 3 – 4 days long and include one 8 – 10 hr long shift per day. In addition, about once a year the group runs 'its own' experiment for about a month at one of the accelerators. Group members typically participate in one or two such experiments during their time with the group. Running our own experiment means taking a more significant leadership role and spending much more time at the lab as compared to regular 'shift taking' work.

Other examples for scenarios that can require non-conventional work hours include securing results for presentation at large conference with a hard deadline, turnaround of referee reports in unique situations and participation in conferences that are sometimes scheduled on a weekend (e.g. most APS meetings) and/or have a schedule that starts early in the morning and ends quite late in the evening.

No matter the scenario that leads to unconventional work hours, it is always temporary, usually planned for well in advance, and we do our very best to acknowledge for the effort it takes by having a reduced work load before or after such time periods.

- Work balance. Group members are encouraged to discuss with Or if they feel overloaded.

Meetings:

The group holds different meetings that group members are expected to participate in. It is highly desired that we hold our meetings in-person as much as possible.

- Project meetings. Our work is typically done in a collaborative manner with colleagues from other institutions. Each project we are involved in usually holds at least one weekly meeting where the collaboration comes together to discuss recent progress and the project path forward.
- Weekly 1:1 meeting with Or. This meeting is ‘yours’ in the sense that you decide what we discuss. This is a good time to bring up any issues that might not be appropriate to bring up in the larger project meetings and/or professional discussions you prefer to hold in private first. I block 30 minutes in my calendar for this meeting but keep a flexible structure: It is ok if we don’t use the full meeting time, and we can also cancel the meeting if there is nothing to discuss on a particular week. Alternatively, we can also schedule a longer meeting in advance if desired.
- Weekly group meeting. The group holds a weekly meeting where issues that are of common interest to all group members are discussed and where group members can get familiar with the work of their colleagues in the group. The meeting rotates between ‘round-table’ meetings, where group members give short presentations of their recent work and ‘focused’ meetings where one group member gives a longer (~ 30 – 40 min long) talk about their work. These longer talks also serve as a professional development tool, allowing the presenter to receive friendly feedback on their presentation skills in a smaller forum and before they go out to present at public conferences.

The organization of the group meeting is typically done by one of the group postdocs. I ask that you do your best to sign up to give a presentation when that person contacts you. If you are contacted and unsure what to talk about you can bring it up in our 1:1 meeting.

- Seminars and colloquia. Holding a broad view of the field is essential for our success as researchers. Group members are therefore expected to attend the weekly LNS lunchtime seminar and colloquium and to actively participate in the HPG journal club. You are also strongly encouraged to also attend the Physics department colloquium.
- Non-formal meetings & direct communication. My calendar is available on line (<https://www.hen-lab.com/internal>). You can always come by my office when I’m not in a meeting. Alternatively, you can contact me anytime via email, Skype (orchen21), or Slack. I will do my best to respond in a timely manner, and you can feel free to ping me if I seemed to have missed your message. I also note that while I might respond outside normal working hours, it does not imply an expectation for you to do the same.

Work-related Travel:

Group members often enjoy the opportunity to travel nationally and internationally as part of their work in the group. This includes traveling to participate in experiments and collaboration meetings and attending conferences. While traveling is usually a fun experience, it is not

always strictly required and, when done, much follow MIT procedures that ensures all aspects are covered.

- Travel planning and booking. The group follows travel regulations set forth by both MIT policy and the agency providing the funding used to support one's trip. We do not expect group members to study all of the latter regulations and instead ask that you *always* consult the LNS travel coordinator (Lauren Saragosa, saragosa@mit.edu) with cc to our group admin (Anna Maria Convertino, amc@mit.edu) prior to organizing your trips. They will guide you through the booking and reimbursement processes.
- General travel expenses. We traditionally cover per-diem, flight costs, hotel accommodation and transportation expenditures, considering the following guidelines:
 - Depending on the destination, transportation needs can vary from renting a car / using taxi / using public transport. You should discuss your transportation plans with Or prior to the trip in order to make sure everything is planned out properly.
 - When traveling with other group members we sometimes ask that you to share a hotel room. Group members should consult on this with Or before booking their hotel room.
 - The daily per-diem we provide comes on top of our covering of local accommodations, transportation costs etc. We keep a fixed base amount for all group members and you should feel free to discuss with Or, either before or after their trip, if you feel that this amount is / was insufficient for your local expenses. By no means should a work trip lead to an added financial burden.
- Out-front and out-of-pocket expenses. Group members are allowed to pay for their travel expenses in advance of their trip and get reimbursed when returning, having followed Lauren's guidance when making their reservations. At the same time, paying for one's travel expenses out-of-pocket that is not strictly required. It is possible to ask for Lauren and/or Anna to use their MIT credit cards to pay for your flight, hotel, and other reservation in advance of your trip. It is also possible to apply for an MIT cash card in order to get your per-diem funds during your trip and not need to pay for it from your own pocket and get reimbursed later. If interested please contact Lauren and Anna *well in advance* of your trip date.
- Extended support. The group is committed to doing its best to support increased financial costs and other personal challenges incurred by work travel. This can include child care expenditures, funding for a family member to join the trip when appropriate and more. If that is relevant for you, please contact Or or Lauren to discuss the type of support that can be provided within the guidance of our funding sources and MIT regulations.
- Reimbursements: when covering travel expenses from one's own pocket, it is MIT policy that the reimbursement for said expenses will only be done after returning from the trip. As we often book flights and reserve hotels well in advance of the trip date, it is highly preferable to make all booking and payments with Lauren's help so that you do not need to get reimbursed and/or minimize your reimbursement amount.

- 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 Or 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 Insurance. 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.
- Power connectors. We keep universal power adapters and compact USB-A and USB-C chargers for travel in Or's office. Group members should feel free asking Or for these units before their travel if they wish.

Conduct and procedures:

- Collegiality. Our success as a group depends on our ability to collaborate. We must always strive to be proactive about sharing our knowledge and helping each other. We must also be able and open to give and receive scientific feedback while maintaining our collegiality and respect for each other.

- Presentation Reviews. Delivering clear and exciting scientific presentations is a central skill for developing ones scientific career. Despite common misperception, being a good speaker is not something one 'has', it is a skill you need to learn and develop. The best and easiest way to improve one's skills is to get feedback from experienced collaborators.

To facilitate efficient internal feedback, all group members giving conference talks should circulate their slides to the group for comments at least 3 days ahead (one week for invited talks). Speakers should also consult with Senior personnel about the need for a practice talk, which they are responsible for scheduling at leads two days in advance of the talk.

- Preliminary data and draft publications. We strive to be transparent and open for collaboration with colleagues from outside the group. At the same time, deciding what preliminary data and results can be shared outside the group can be tricky. Therefore, group members may not share information (such as preliminary results or publication drafts) that is not already publicly available without explicit permission from Or.
- Archiving. All talks should be uploaded in original form (e.g., ppt or keynote) as well as pdf to the group docDB. After writing a paper, lead authors must ensure that high-quality (i.e., vector graphic pdfs) versions of all figures associated with their paper are added to the group figure repository.
- Code writing. For any code you'll be using over a period of time, i.e., longer than ~2 weeks, we ask that you keep it version-controlled with git, and keep it backed up to github. By default, your github repos should be kept as private (we can always decide to make them

public later when you need to). Common software tools that are useful for many group members should go to the henlab git repo.

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 funding. In accordance with LNS and Physics Department policies, we only make hires when funding already exists and/or is extremely likely to be secured.
- External funding. Group members sometime have external funding sources (fellowships etc). Securing external funding can often ‘free’ other funds in a way that allows sending group members to more conferences and ensure you all have good hardware to do your work with. At the same time, **we do not treat group members differently depending on their source of funding.**

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. Group members are encouraged to keep an eye out for fellowships application calls and apply whenever possible. I am always happy to provide reference letters for your applications.

Publication Authorship:

We strive to promote the efforts of students and postdocs as much as possible. In most cases authorship rights on group publications, and the ordering of authors names, is clear based on the work done. At the same time, there are special cases that are less clear and where I will have to make a decision taking various considerations into account. On my end, I promise to be as transparent as possible with my decision and its reasoning. On your end, by joining the group, you agree to accept my decision on these matters.

General procedures:

Our group is part of the MIT Physics Department and Laboratory for Nuclear Science (LNS). While there are exceptions, the academic aspects of our work such as graduate student appointment, classes, TA work, qualifying exams etc. are supported by the Physics Department. Our research work is supported by the LNS, which includes lab operations and safety, travel, postdoc appointments etc.

Our day-to-day conduct therefore follow the procedures put forth by both the Physics Department and LNS, in addition to the general MIT guidelines. Group members are strongly encouraged to familiar themselves with these procedures by reviewing the ‘Services & Resources’ section of the LNS website (<https://web.mit.edu/lns/>) 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.

To be filled by the PI:

1. After reviewing your student's assessment of their progress in the past year, do you feel they have made satisfactory progress?
2. Do you concur with your student's work plan for the coming year? Are they on track for graduation and on what time scale?
3. After reviewing your student's own career goals and timetable, do you feel they are making sufficient progress towards these goals? Are the goals realistic?
4. Describe any other professional or career development issues you would like to discuss with your student?

Postdocs Annual Development Review Template (provided by MIT):

LNS Annual Development Review for Postdoctoral Researchers

PART I – TO BE FILLED OUT BY THE POSTDOCTORAL RESEARCHER

Postdoctoral Researcher:	Supervisor:
Title:	Review Period:
Date of hire:	Review meeting date:

1. Describe your career goals, along with a rough timetable. Have these changed during the last year?

2. **Very briefly** describe your scientific progress during the last year.

3. List any publications, seminars given, honors and awards you have received over the past year.

4. What progress have you made towards your career goals? Do you feel that you are making sufficient progress towards these goals?

5. Describe any other professional or career development issues you would like to discuss with your PI.

