

Yale



Wright
Laboratory

National Nuclear Physics Summer School

NNPSS 2018

June 17 - 30, 2018

Wright Lab at Yale University

New Haven, CT

Calling all grad students & postdocs! Come explore recent developments and future directions in the field. Experts from across the nation will deliver in-depth lectures, seminars and tutorials at Yale's Wright Lab and Science Hill. Engage in hands-on experimental design, a poster presentation and a tour of Brookhaven National Laboratory. Enjoy living on Yale's historic campus.

Hadron Structure

Heavy Ion Physics

Neutrinos

Neutrons and Fundamental Symmetries

Nuclear Astrophysics

Nuclear Structure



LOC Helen Caines, Chair • Yoram Alhassid • John Harris • Karsten Heeger • Francesco Iachello • Reina Maruyama • David Moore

wlab.yale.edu/nnpss2018



INSTITUTE for
NUCLEAR THEORY



Center for Frontiers
in Nuclear Science

BROOKHAVEN
NATIONAL LABORATORY

NNPSS 2018 Participant's Handbook

Welcome

Welcome to the National Nuclear Physics Summer School 2018 at Yale University, hosted by Wright Laboratory! We are very excited that you will be a part of this experience this year.

For over 25 years, NNPSS has been the premier school in the US for graduate students and postdoctoral researchers to learn about recent developments and future directions in nuclear science. During this year's program, you will hear experts from across the nation deliver in-depth lectures from both theory and experimental perspectives, special topical seminars, and hands-on tutorials. Participants will also each present a poster and tour Brookhaven National Laboratory. The area has many other extracurricular activities for participants to pursue in New Haven during the time period of the school, including the International Festival of Arts and Ideas. We look forward to having you be a part of this tradition and seeing you on campus soon!



Dr. Helen Caines
NNPSS 20178 LOC Chair

NNPSS Contacts

Local Organizing Committee: Yoram Alhassid, Helen Caines, John Harris, Karsten Heeger, Francesco Iachello, Reina Maruyama, David Moore

Administrative Support: During business hours (8:30 a.m. – 5:00 p.m.), please contact one or more of the following for administrative matters: Paula Farnsworth (paula.farnsworth@yale.edu, 203-432-6044), Victoria Misenti (victoria.misenti@yale.edu), Wright Lab business office (203-432-3090).

Mail at NNPSS 2018: We encourage you to bring everything you need with you, but if you need to have something mailed to you while you are at NNPSS 2018, you can have it sent the Wright Lab business office at:

Your Name at NNPSS 2018
c/o Wright Laboratory
Department of Physics
Yale University
P.O. Box 208120
New Haven, CT 06520-8120
U.S.A.

Yale will not assume liability for items shipped or stored at Yale. If there are any materials remaining after the Program ends, the Yale Conferences & Events Program Liaison must be advised of arrangements to have those items picked up by a carrier within 48 hours. Any materials remaining after 48 hours become the property of Yale, and the participant may be charged for their disposal.

A healthy environment

NNPSS 2018 is committed to providing an atmosphere that encourages the free expression and exchange of scientific ideas. In pursuit of that ideal, NNPSS 2018 is dedicated to the philosophy of equality of opportunity and treatment for all members, regardless of gender, gender identity or expression, race, color, national or ethnic origin, religion or religious belief, age, marital status, sexual orientation, disabilities, veteran status, or any other reason not related to scientific merit. All forms of discrimination, harassment, and retaliation will not be tolerated and persons behaving in such a manner will be subject to disciplinary action.

Overview and Expectations

Participants of NNPSS 2018 are expected to participate fully in all official activities of the school, which runs from Monday, June 18th through Friday, June 29th, 2018.

The academic program of the school takes place Monday through Friday from 9:00 a.m. to 6:00 p.m. Additionally, there are a few evening events that students are expected to attend, as shown in the schedule at the end of this document.

Planned extracurricular activities on evenings and weekends are optional for students to attend.

Breakfast and lunch are provided by the school in the dormitory cafeteria on weekdays. Participants are asked to provide their own dinner and meals on weekends.

Participants of NNPSS 2018 are welcomed by Yale University as guests. To make the program experience as enjoyable as possible for all, Yale asks that everyone respect those around them. Activities that disturb or distress others, damage property, or endanger staff, participants or others are prohibited. Some specific guidelines are outlined, below:

- **Dangerous Devices:** Possession of weapons, firearms, or dangerous instruments, with or without a permit, as well as anything that could be perceived or misrepresented as a weapon, is prohibited.
- **Alcohol and Drugs:** Alcoholic beverages may only be consumed by guests who are 21 years of age or older in residential accommodations with doors closed, and in an atmosphere that does not create significant noise or other disturbances. Alcoholic beverages are permitted in residence hall common areas only with the approval the Yale Conferences & Events Program Liaison. No one is permitted to serve alcohol to persons under 21 years of age. The possession, use, sale, distribution, cultivation, or manufacture of illegal drugs is prohibited.
- **Smoking:** Yale University is a tobacco free campus. Use of cigarettes, e-cigarettes, or any other tobacco product is prohibited in all areas including property leased or owned by the University and including all University-owned green spaces such as Residential College courtyards, Cross Campus, or University-owned walkways. This policy is in effect 24-hours a day and applies to all program staff, participants, or guests while they are on-campus.
- **Minors:** No one under the age of 13 is permitted to stay overnight in the facilities provided by NNPSS 2018.
- **Program Identification:** All Participants and Staff are required to wear a lanyard identifying their program affiliation at all times.
- **Guests:** No guests are allowed in the residential and dining facilities.
- **Noise:** Participants and Staff must keep noise to a minimum and honor evening quiet hours:
 - 10:00 p.m. – 8:00 a.m. Sunday –Thursday
 - 12:00 a.m. – 8:00 a.m. Friday and Saturday
- **Animals:** No animals of any kind are allowed in the residential and dining facilities.
- **Windows and Stairwells:** Throwing liquids or objects from windows or stairwells is prohibited. Participants and staff may not lean out of windows or sit or walk on window ledges or roofs.
- **Bicycles:** Bicycles may be locked to bicycle racks only. If a bicycle is found attached to anything other than a bicycle rack, such as railings, it may be removed and the participant will be charged.
- **Furnishings:** All furniture in the Facilities must remain in its designated area and in its original setup. Furniture not in its original location at the end of the Program may result in charges to the participant. The following items are not allowed in residential spaces: space heaters, open flames, incense, A/C units and small cooking appliances such as hot plates, toasters, griddles, and coffeepots. Blocking of fire doors and the hanging of items on sprinkler pipes or heads is strictly prohibited. Do not prop open any doors.

- **Outside Food:** Outside food and/or beverages may not be brought into Yale residential dining facilities.
- **Violation of the General Conduct and Regulations:** The charge associated for each violation of the above activities is \$100 for the first complaint, \$200 for the second and \$500 for the third.
- **Lockouts:** If you are locked out of your dormitory, contact Yale Conferences and Services during office hour or Yale Security at 203-785-5555 after office hours.
- **Missing Key and Access Cards:** Upon departure, the participant must return all assigned keys and access cards to Yale, unless otherwise arranged. The participant must pay a replacement fee of \$50.00 each for all lost keys and access cards. Keys not recovered from the participant within five business days of the program end date will be deemed lost.
- **Laboratories and Machine Shops:** Participants must comply with all safety guidelines when in laboratories and machine shops. This may include wearing appropriate clothing, such as long pants or long-sleeved shirts and closed-toed shoes, so please be sure to bring appropriate clothing for this.
- **Damage:** The participant is responsible for any and all damage caused to Yale facilities. Yale will inspect the facilities for damages after the conclusion of the program and the participant may be charged for cleaning if the facilities are not cleared and cleaned adequately.

What to Bring (and What not to Bring)

Clothing: You should bring comfortable, casual clothes that are appropriate for going to class. It gets hot and humid in New Haven in the summers, but it can get cool at night, so it is a good idea to bring a sweater or a light jacket. The classroom facilities have air conditioning and the dormitories have natural cooling vents. We suggest sturdy, comfortable shoes for walking around New Haven, including from the dormitory and dining facilities to the school and back.

We are taking a field trip to Brookhaven National Laboratory **where long pants and closed-toed shoes are required**, so please make sure you bring these or you will not be able to go on this tour. You may also want to bring more business-like attire for our evening banquet and poster session. We plan to organize an optional trip to a beach, so bring swimwear and a beach towel if you want to get into the water. You will be able to do laundry in the dorm using a special debit card – we suggest bringing a laundry bag if you wish to do laundry.

Electronic Devices: We suggest bringing a laptop for some of the tutorial activities. If you do not have a personal laptop, please let us know and we will work with you to borrow one, if needed, for those activities that require a laptop.

You are responsible for any electronic devices you bring, please keep track of them and do not leave them unattended and be sure to lock your dormitory room doors and windows when you are not in the room.

You should not bring large electronics items like TVs, video game consoles, microwaves, mini-fridges, etc.

Other prohibitions: Anything that is volatile or easily catches fire (e.g. candles, lighters, and fireworks) or could be considered to be weapon is prohibited. Additionally, Yale is a tobacco-free campus (see p. 2 section on smoking for more information).

Other Items: Make sure to bring all of the personal items you will need such as toiletries, sunscreen, your medications, cell phone charger, and perhaps a water bottle or travel mug for hot beverages. Bedding linens will be provided by NNPSS 2018. We also recommend a small umbrella for the summer rain. There are shops within walking distance, but the program is tightly scheduled so it is best if you bring what you can.

Please also bring your health insurance card, prescription card (if applicable) and government-issued ID card (driver's license, state ID, or passport). You will not be able to go on the trip to Brookhaven National Laboratory without a government-issued ID.

Health insurance

Neither Yale nor NNPSS 2018 offers health insurance of any kind. You are expected to have insurance that will cover you in the event of any health problem, mental or physical. We are located very close to the Yale Health Urgent Care Center as well as the Yale New Haven Hospital in the case of an emergency, and there are other health care providers in the area which you can see if necessary.

If you are visiting the US from another country, you must purchase a health insurance plan that will cover you for the two weeks of the program (and bring your insurance card with you). Yale provides some guidance here: <https://oiss.yale.edu/life-at-yale/health-wellness/health-coverage-options> - we recommend looking at the private insurance plans as they are much cheaper than the Yale plans. Health insurance may also be part of a travel insurance package.

Safety

For the most part, New Haven and the areas around Yale campus are quite safe, although as with any medium-sized city, New Haven has its share of petty crimes, especially at night in the warm summer months. We suggest travelling with a friend or group of friends if you are going out at night. It is also recommended to have a cellphone on your person, but not displayed visibly.

If you are ever approached by a stranger who threatens you, or if you feel unsafe for any reason at any time, there are Yale Police call boxes all over campus, marked by a bright blue light. Press the red button and then talk to the dispatcher who answers. In the event of an emergency, you should dial 9-1-1 on your cellphone or go to the nearest police box if you don't have a cellphone with you. After contacting emergency services, please contact the NNPSS 2018 staff and let them know about the situation.

The non-emergency number for Yale Security is 203-785-5555.

Maps of Campus and Lodging Information

There is an interactive map of the Yale campus here: <http://map.yale.edu/>.

We will be sleeping at Benjamin Franklin College and having breakfast and lunch there as well. Check-in will happen at the College on Sunday, June 17 from 4 pm to 8 pm. Look for the NNPSS signs. If you are unable to arrive within this window, contact the YC&E onsite office at 203-436-2301 when you arrive (available until 12:30 a.m.) and ask to be checked in. Check out will happen the morning of June 30 at 11:00 a.m., and all students should have left the dorm by noon.

Parking

Participants with cars can pay to obtain a code to park at the Pierson Sage Garage, which is next to Wright Lab. Parking costs \$112 for the duration of the school, payable by cash or check to Yale University at check-in. Additionally, most Yale parking lots are free and open to the public 4pm - 7am and all day on weekends. See the [Yale Parking Map](#) for more information.

Getting Around Campus and Around Town

All NNPSS 2018 participants will have free access to Yale's shuttle service. The service runs multiple routes daily throughout the Yale campus. If you cannot safely go to one of the listed stops, call 203-432-6330. The dispatcher will radio one of the buses to go off route and pick you up. If you require an escort to the nearest pick-up point, the Walking Escort Service is available 24 hours/day, 7 days/week. The number to call is 203-432-9255, or 203-785-5555.

Routes and schedules can be found here: <https://your.yale.edu/community/getting-around-yale/shuttle/daytime-routes>. Real-time shuttle locations are posted here: <http://yale.transloc.com/>.

Benjamin Franklin College (the dorm) is located at 90 Prospect Street, New Haven, CT. The northbound Orange and Blue lines stop at Prospect/Trumbull and Prospect/Sachem. The southbound Red line stops on the walkway between Benjamin Franklin and Pauli Murray (dorm next door to Franklin).

For information about New Haven, please check here: <https://www.infonewhaven.com/>.

Your stay at Yale coincides with part of New Haven's annual *International Festival of Arts and Ideas*. Please visit the official website to find out about free and low-cost events in town: <https://www.artidea.org/>.

Gym Memberships Available

You may purchase a membership to Yale's Payne Whitney Gym while a participant of NNPSS 2018. The price is \$25/week and includes access to the gym facilities including the swimming pool, exercise room, and jogging track. Towel service and locker rental is available for an additional fee. To inquire about these additional services, please see the attendant in the gym main lobby desk.

For other questions about registration, please contact Yale Conferences & Events at 203-432-0465 or conferencesandevents@yale.edu.

Register and pay online here: <http://www.cvent.com/events/2018-gym-membership-at-yale-university/event-summary-a7ffc5d6c2d045ba9198a50c9838cd9c.aspx>

Internet Access on Campus

All NNPSS 2018 participants will have access to free wi-fi in all campus buildings. Information about campus wi-fi can be found here: <https://its.yale.edu/services/internet-phones-and-television/network-infrastructure-services/wifi>.

Poster guidelines

Presentation of a poster provides an opportunity for effective one-to-one communication and enables you to present an in-depth description and discussion of your work.

To make a successful poster presentation:

- Your poster must be designed to fit within the confines of a 44" high x 91" wide posterboard, and consist of materials that can be mounted easily with push pins.
- Plan your poster to be in logical sequence, i.e. introduction, study design and methods, data collected, conclusion.
- Posters should be designed for clear viewing from a distance of beyond 3' so that they can be viewed by a number of people at the same time.
- To ensure visual effectiveness of your poster, use large lettering and a minimum of text.
- Use of color can visually enhance your poster.
- AV is not allowed - posters should be displayed using effective printed visuals.

Travel information

For information about travelling to and from the program, please see our website here: <https://wlab.yale.edu/summer/nnpss-2018/location>.

NNPSS 2018 Agenda

v. May 31, 2018

Week 1:		18-Jun-2018
9:00-9:30	Welcome to NNPSS Helen Caines, Yale University	
9:30-10:30	Nuclear Structure Theory I Mark Caprio, Univ. of Notre Dame	
10:30-11:00	Break	
11:00-12:00	Nuclear Structure Theory II Mark Caprio, Univ. of Notre Dame	
	Lunch	
2:00-3:00	Heavy Ion Theory I Bjoern Schenke, Brookhaven National Laboratory	
3:00-3:30	Break	
3:30-4:30	Heavy Ion Theory II Bjoern Schenke, Brookhaven National Laboratory	
4:30-5:30	Nuclear science and national security Anna Hayes, Los Alamos National Laboratory	
6:00-7:00	Opening Reception Held at Wright Laboratory	

		19-Jun-2018
9:00-10:00	Nuclear Structure Theory III Mark Caprio, Univ. of Notre Dame	
10:00-11:00	Heavy Ion Theory III Bjoern Schenke, Brookhaven National Lab	
11:00-11:30	Break	
11:30-12:30	Nuclear Astrophysics Experimental I Chris Wrede, Michigan State University	
	Lunch	
2:00-3:00	Nuclear Astrophysics Experimental II Chris Wrede, Michigan State University	
3:00-4:00	Meet with speakers	
4:00-4:30	Break	
4:30-6:00	Lab tour / Tutorial 1	

		20-Jun-2018
9:00-10:00	Nuclear Astrophysics Experimental III Chris Wrede, Michigan State University	
10:00-11:00	Neutrons and Fundamental Symmetries Experimental I Chen-Yu Liu, Indiana Univ.	
11:00-11:30	Break	
11:30-12:30	Neutrons and Fundamental Symmetries Experimental II Chen-Yu Liu, Indiana Univ.	
	Lunch	
2:00-3:00	Neutrons and Fundamental Symmetries Experimental III Chen-Yu Liu, Indiana Univ.	
3:00-4:00	Nuclear data Elizabeth McCutchan, Brookhaven National Lab	
4:00-4:30	Break	
4:30-5:30	Meet with speakers	

		21-Jun-2018
9:00-10:00	Neutrons and Fundamental Symmetries Theory I Susan Gardner, Univ. of Kentucky	
10:00-11:00	Neutrons and Fundamental Symmetries Theory II Susan Gardner, Univ. of Kentucky	
11:00-11:30	Break	
11:30-12:30	Nuclear Structure Experimental I Alexandra Gade, Michigan State University	
	Lunch	
2:00-3:00	Nuclear Structure Experimental II Alexandra Gade, Michigan State University	
3:00-4:00	Meet with speakers	
4:00-4:30	Break	
4:30-6:00	Lab tour / Tutorial 1	
6:00-7:00	Poster session and dinner Held at Wright Laboratory Vault	

		22-Jun-2018
9:00-10:00	Heavy Ion Experimental I Megan Connors, Georgia State Univ.	
10:00-11:00	Heavy Ion Experimental II Megan Connors, Georgia State Univ.	
11:00-11:30	Break	
11:30-12:30	Neutrinos Experimental I Diana Parno, Carnegie Mellon University	
	Lunch	
2:00-3:00	Neutrinos Experimental II Diana Parno, Carnegie Mellon University	
3:00-3:30	Break	
3:30-4:30	Frontiers of instrumentation in nuclear science Paul O'Connor, Brookhaven National Laboratory	
4:30-5:30	Meet with speakers	

Week 2:		25-Jun-2018
9:00-10:00	EIC Experimental and Theory I Thomas Ullrich, Yale University	
10:00-11:00	Neutrinos Experimental III Diana Parno, Carnegie Mellon University	
11:00-11:30	Break	
11:30-12:30	Neutrino Theory I Michael Ramsey-Musolf, UMass Amherst	
	Lunch	
2:00-3:00	Neutrino Theory II Michael Ramsey-Musolf, UMass Amherst	
3:00-3:30	Break	
3:30-4:30	Meet with speakers	
4:30-6:00	Tutorial 2	
6:00-8:00	Dinner and session on diversity & inclusion Held at Wright Laboratory	

		26-Jun-2018
9:00-10:00	Neutrino Theory III Michael Ramsey-Musolf, UMass Amherst	
10:00-11:00	EIC Experimental and Theory II Thomas Ullrich, Yale University	
11:00-11:30	Break	
11:30-12:30	Hadron Structure Experimental I Anselm Vossen, Duke	
	Lunch	
2:00-3:00	Hadron Structure Experimental II Anselm Vossen, Duke	
3:00-3:30	Break	
3:30-4:30	Art and nuclear science seminar Agnes Mocsy, Pratt Institute	
4:30-5:30	Meet with speakers	

		27-Jun-2018
8:30a-8:00p	Trip to Brookhaven National Laboratory	

		28-Jun-2018
9:00-10:00	Hadron Structure Theory I Alexei Prokudin, JLab	
10:00-11:00	Hadron Structure Theory II Alexei Prokudin, JLab	
11:00-11:30	Break	
11:30-12:30	Nuclear Astrophysics Theory I Gail McLaughlin, North Carolina State University	
	Lunch	
2:00-3:00	Nuclear Astrophysics Theory II Gail McLaughlin, North Carolina State University	
3:00-3:30	Break	
3:30-4:30	Meet with speakers	
4:30-6:00	Tutorial 3 / Tutorial 4	

		29-Jun-2018
9:00-10:00	Nuclear Astrophysics Theory III Gail McLaughlin, North Carolina State University	
10:00-11:00	Hadron Structure Theory III Alexei Prokudin, JLab	
11:00-11:30	Break	
11:30-12:30	X-ray and Gamma-ray Imaging in Medicine Chi Liu, Yale University	
	Lunch	
2:00-5:30	Activities TBA	

NNPSS 2018 website: wlab.yale.edu/nnpss2018
Wright Lab website: wlab.yale.edu

