



**Metasurface Optics for High-Contrast Imaging:
Design, Fabrication, and Implementation**

**Date September 23-27, 2024
Overview Schedule**

**Monday, September 23, 2024
Hameetman Auditorium, Cahill Building - Caltech**

**Short Course: Nano Engineering for Exo Discoveries: Advancing Metasurfaces for Exoplanet Exploration
Introductory Lectures - Open to all interested students, researchers and faculty**

Time	Event	Speaker
8:15 - 8:45	Coffee and Refreshments	
8:45 - 9:00	Logistics / Introduction	Harriet Brettle Team Leads
9:00 - 9:45	Short Course Lecture #1 - Introduction to Metasurfaces	Noah Rubin
9:45 - 10:30	Short Course Lecture #2 - High Contrast Imaging	Dimitri Mawet
10:30 - 11:00	Break	
11:00 - 11:45	Short Course Lecture #3 - Metasurface Design	Jonathan Fan
11:45 - 12:30	Short Course Lecture #4 - Metasurface Fabrication	Tobias Wenger
12:30 - 1:30	Short Course Ends: Informal Lunch is provided outside on the Cahill Patio	

**Invitation-Only Workshop Begins
Keck Center - Think Tank, Room 155**

1:30 - 1:45	Walk to Keck Center, pick up badge and welcome packet, find seat in the Think Tank	
1:45 - 2:30	Workshop Logistics and Introduction to KISS	Harriet Brettle
2:30 - 3:00	Participant Introductions	Harriet Brettle
3:00 - 3:30	Study vision and goals for this workshop	Team Leads
3:30 - 4:00	Break	
4:00 - 5:00	Finalize study vision and workshop goals via plenary discussion	Team Leads
5:00 - 5:30	Solicitation of Lightning Talks	Team Leads
5:30 - 6:00	Pack up and walk to dinner	All
6:00	Dinner at Green Street Restaurant	

Tuesday, September 24, 2024 - Keck Center - Think Tank, Room 155

Time	Event	Speaker
8:00 - 8:30	Institute Opens - FREE THINK TIME	
8:30 - 9:00	Coffee and Refreshments at Keck Center	
9:00 - 9:15	Logistics and Team Lead Goals for the Day	Harriet Brettle and Team Leads
9:15 - 10:00	The End-User Challenge! Facilitated discussion	Dimitri Mawet
10:00 - 10:30	Lightning Talks <ul style="list-style-type: none"> • State of the Art for Coronagraphs (including Liquid Crystals) – Gene Serabyn • Existing Metasurface Vortex Design Efforts – Skyler Palatnick & Lorenzo König 	Gene Serabyn Skyler Palatnick & Lorenzo König
10:30 - 11:00	Break	
11:00 - 11:15	Introduction to Breakout Groups and Topics	Harriet Brettle
11:15 - 12:30	Breakout Groups: Key Challenges and Opportunities for the following: <ol style="list-style-type: none"> 1. End-users: astronomers and astrophysicists 2. Modellers 3. Fabrication 4. Metrology 	Groups
12:30 - 2:00	Group Picture and Lunch at the Keck Center	
2:00 - 2:45	Report outs from breakout groups (10 mins each)	Groups
2:45 - 3:15	Lightning Talks <ul style="list-style-type: none"> • Polarization Aberration Correction – Dan Shanks • Making Things Achromatic – Noah Rubin & Thomas Milster 	Dan Shanks Noah Rubin & Thomas Milster
3:15 - 3:30	Review of Blue Skies Ideas and selection of next topics	All
3:30 - 4:00	Break	
4:00 - 5:30	Breakout Groups: <ol style="list-style-type: none"> 1. How does a metasurface maker know what to build? 2. How does a exoplanet scientist know the metasurface will work to their requirements? 3. Metasurface devices that we want today 	Groups
5:30 - 7:30	POSTER SESSION and Informal dinner at the Keck Center (dinner starts at 6:30 pm)	

Wednesday, September 25, 2024 - Keck Center - Think Tank, Room 155

8:00 - 8:30	Institute Opens - FREE THINK TIME	
8:30 - 9:00	Coffee and Refreshments at Keck Center	
9:00 - 9:15	Logistics and Team Lead Goals for the Day	Harriet Brettle and Team Leads
9:15 - 9:45	Report Outs from Breakout Groups (10 mins each)	Groups
9:45 - 11:00	Understanding software tools used in the design process including: 1. Tools for high-contrast imaging 2. Tools for the modeling of micro structures 3. Discussion on how to merge these tools efficiently - blueprint for the interface	Emiel Por
11:00 - 11:30	Break	
11:30 - 12:15	Group Pulse: "Taking Away" & "Want to Accomplish Yet"	All
12:15 - 12:30	Selection of Breakout Groups	
12:30 - 2:00	Lunch at the Athenaeum	
2:00 - 3:30	Breakout Group Discussion 1. Short Term Projects - including implementing metasurfaces and wavefront sensing 2. Metrology & Sensing, including testbeds 3. The Habitable Worlds Observatory	All
3:30 - 4:00	Break	
4:00 - 4:45	Report outs from breakout groups	Groups
4:45 - 5:30	Plenary Session - Workshop Findings and Report outline Review of ideas and next steps Importance of Illustrations - KISS Gallery	All
5:30	Workshop Day #3 Ends	All
6:00	OPTIONAL: No-Host Dinner in Pasadena + optional Griffith Observatory visit	

Thursday, September 26, 2024 - Keck Center - Think Tank, Room 155

8:00 - 8:30	Institute Opens - FREE THINK TIME	
8:30 - 9:00	Coffee and Refreshments at Keck Center	
9:00 - 9:15	Logistics and Team Lead Goals for the Day	Harriet Brettle and Team Leads
9:15 - 10:00	Plenary Group Discussion: Path Forward for Collaboration, Discussion on future projects	Kent Wallace
10:00 - 10:30	KISS Outputs - Final Report and Stakeholders	Harriet Brettle
10:30 - 11:00	Break	
11:00 - 12:30	Breakout Groups - Report Drafting Sprints	All
12:30 - 2:00	Lunch on your own	
2:00 - 2:30	Coffee @ KISS - THINK TIME (individual, or self organizing small groups)	All
2:30 - 3:15	Lightning Talks 1. Dual-purpose focal plane masks - Kent 2. Stacking Metasurfaces - Joon-Suh 3. Grating vortex + PAPLC - Emiel 4. Diamond vortex - Mikael / Olivier	Groups
3:15 - 3:30	Plenary Discussion, Selection of Writing Groups	All
3:30 - 4:00	Break	
4:00 - 5:30	Group Writing Sessions	Groups
5:30 - 6:00	Walk over to the Athenaeum	All
6:00	Closing Dinner at the Athenaeum	

Friday, September 27, 2024 - Keck Center - Think Tank, Room 155

Time	Event	Speaker
8:00 - 8:30	Institute Opens - FREE THINK TIME	
8:30 - 9:00	Coffee and Refreshments at Keck Center	
9:00 - 9:15	Logistics and Team Lead Goals for the Day	Harriet Brettle and Team Leads
9:15 - 10:00	Illustration Discussion - Cover Art	All
10:00 - 10:30	Path Forward + Timeline	All
10:30 - 11:00	Break	
11:00 - 12:30	Breakout Groups: Technology Gaps Report out from each breakout group (30 mins)	All
12:30 - 2:00	Lunch + Lab Tour	
2:00 - 4:00	Breakout Groups: Small Group Drafting Sessions Report out from each breakout group (30 mins)	All
4:00 - 5:00	Workshop Closeout	Harriet Brettle
5:00	Institute Closes	