

# 2023 Virtual School on Many-Body Calculations using EPW and BerkeleyGW

June 5-9 2023



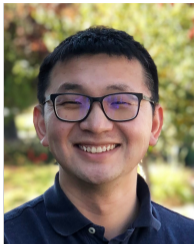
U.S. DEPARTMENT OF  
**ENERGY**

**TACC**

## Organizers



**Roxana Margine**  
Binghamton University



**Zhenglu Li**  
University of Southern California



**Feliciano Giustino**  
University of Texas at Austin



**Emmanouil Kioupakis**  
University of Michigan at Ann Arbor



**Samuel Poncé**  
Université catholique de Louvain

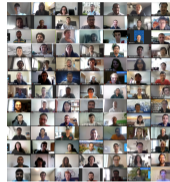


**Steven G. Louie**  
University of California at Berkeley



**Annecy Liddell**  
University of Texas at Austin

Virtual



2018

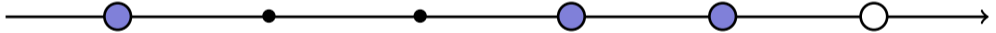
2019

2020

2021

2022

2023



ICTP Trieste



Austin, TX

# Instructors



**Roxana Margine**  
Binghamton University



**Zhenglu Li**  
University of Southern  
California



**Feliciano Giustino**  
University of Texas  
at Austin



**Emmanouil Kioupakis**  
University of Michigan  
at Ann Arbor



**Samuel Poncé**  
Université catholique de  
Louvain



**Steven G. Louie**  
University of California  
at Berkeley



**Jon Lafuente-Bartolome**  
University of Texas  
at Austin



**Chao Lian**  
University of Texas  
at Austin



**Joshua Leveillee**  
University of Texas  
at Austin



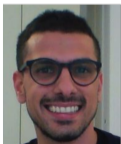
**Sabyasachi Tiwari**  
University of Michigan  
at Austin



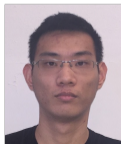
**Hitoshi Mori**  
Binghamton University



**Christopher Renskers**  
Binghamton University



**Marios Zacharias**  
University of Rennes



**Xiao Zhang**  
University of Michigan  
at Ann Arbor



**Kyle Bushick**  
University of Michigan  
at Ann Arbor



**Amanda Wang**  
University of Michigan  
at Ann Arbor



**Mauro Del Ben**  
Lawrence Berkeley  
National Laboratory and  
C2SEPEM Center



**Jack Deslippe**  
Lawrence Berkeley  
National Laboratory



# TAs

Charlsey Tomassetti, Binghamton U

Gyanu Kafle, Binghamton U

Viet-Anh Ha, UT Austin

Sungyeb Jung, UT Austin

Kaifa Luo, UT Austin

Jie-Cheng Chen, UT Austin

Zhenbang Dai, UT Austin

Eugene Park, UT Austin



Day	Time	Activity	Instructor
Mon 5 June	8:00-8:10am	Welcome & Intro	
	8:10-9:10am	<b>Lecture:</b> Many-body theory of electron-phonon interactions	Giustino
	9:10-10:10am	<b>Lecture:</b> Carrier transport	Poncé
	10:30-10:20am	Break	
	10:20-10:30am	Login to Frontera	
	10:30-11:30am	<b>Hands-on tutorial:</b> Interpolation of electron-phonon matrix elements	Poncé
	11:30am-12:30pm	<b>Hands-on tutorial:</b> Carrier transport	Leveillee/Poncé
Tue 6 June	8:00-9:00am	<b>Lecture:</b> Superconductivity	Margine
	9:00-10:00am	<b>Lecture:</b> Optical absorption	Kioupekis
	10:00-10:30am	Break	
	10:30-11:30am	<b>Hands-on tutorial:</b> Superconductivity	Mori/Margine
	11:30am-12:30pm	<b>Hands-on tutorial:</b> Optical absorption	Zhang
Wed 7 June	8:00-9:00am	<b>Lecture:</b> Theory of polarons	Giustino
	9:00-10:00am	<b>Lecture:</b> Special displacement method	Zacharias
	10:00-10:30am	Break	
	10:30-11:30am	<b>Hands-on tutorial:</b> Polarons	LaFuente-Barloomé/Lian
	11:30am-12:30pm	<b>Hands-on tutorial:</b> Electron-phonon couplings & anharmonicity with special displacements	Zacharias
	12:30pm-2:00pm	<b>Poster Session</b>	
Thu 8 June	8:00-9:00am	<b>Lecture:</b> Diverse excited-state phenomena: novel excitonic states, dynamics, and correlation effects	Louie
	9:00-10:00am	<b>Lecture:</b> BerkeleyGW package: implementation, uniqueness, and exascale	Del Ben
	10:00-10:30am	Break	
	10:30-11:30am	<b>Hands-on tutorial:</b> GW	Del Ben
	11:30am-12:00pm	<b>Hands-on tutorial:</b> BSE	Li
Fri 9 June	8:00-9:00am	<b>Lecture:</b> Many-body perturbation theory: GW and GW-BSE methods	Deslippe
	9:00-10:00am	<b>Lecture:</b> GW perturbation theory and its applications in electron-phonon phenomena	Li
	10:00-10:30am	Break	
	10:30-11:30am	<b>Hands-on tutorial:</b> Convergence	Del Ben
	11:30am-12:30pm	<b>Hands-on tutorial:</b> 2D materials	Li
	12:30-12:40pm	Closing remarks	Giustino

Webinar mode

Break

Meeting mode



Poster session & prizes

XX Posters



Info, Schedule, Slides, Tutorial Sheets:

[epw2023.oden.utexas.edu](http://epw2023.oden.utexas.edu)

[Slack Channel School2023-EPW-BerkeleyGW](#)