UC SANTA BARBARA

Kavli Institute for Theoretical Physics

Newsletter

www.kitp.ucsb.edu Spring 2021

CARTER HIYAMA

Lars Bildsten

Now one year past the onset of the pandemic, KITP is set to re-open, hopefully by Fall 2021. As the banner image above shows, we have completed our rebuild from the March 2020 Kohn Hall flood and taken advantage of the empty building to replace carpets, upgrade lighting and touch-up the paint. For a 27-year-old building, Kohn Hall really sparkles! The talented staff at the Munger Physics Residence have kept that facility "ship-shape" while also performing important preventative maintenance tasks that are difficult to complete during our normal fast paced full-house setting. Bottom line, our infrastructure is renewed and ready to roll!

KITP's yearlong pivot to Zoom has been a remarkable story of innovation and experimentation as we continued to serve our international community of physicists under new circumstances. Our talented staff have made all of this possible and have continued to enthusiastically engage in achieving our important mission. Pages 2 and 3 describe the first program we ran on Zoom and the lessons learned there that positively impacted all of our subsequent efforts. Don't miss the great quote in that article from David Kaczorowski, KITP's Program Manager! In the year 2020, we engaged over 2,000 unique scientists in our online activities, with the overwhelming majority saying that they would eagerly participate in a future KITP program. We have seen the benefits of broadening the access to KITP's activities and are in the midst of infrastructure enhancements in Kohn Hall to make remote participation seamless even when we return to in-person activities. Demand for in-person visits remains very high and we are actively inviting participants for Fall 2021 visits.

Our April 2021 Virtual Site Visit by the National Science Foundation was very positive, and ensures the continuation of our current grant. The "all hands on deck" work of preparing for this Site Visit provided another example of the dedication of KITP's staff. It's an honor and privilege to work with such a talented, excited and thoughtful group of professionals. You can read about one of them, Deputy Director Mark Bowick, starting on page 6.

The Site Visit also gave us a chance to self-assess how well we are doing to achieve our stated mission. One element of our mission is: "KITP responds to new scientific opportunities, encourages transformational research, and promotes diversity by ensuring broad opportunities and representation." We survey KITP's participants to learn answers to some of these questions. For example, over 75% of participants agreed or strongly agreed with the statement: "The atmosphere was inclusive and supportive for all participants". This is a key element of KITP's success, the ability for all to fully participate and shine. Another element of our mission states: "The primary goal is to promote scientific progress by bringing together accomplished researchers for sufficient time to form new collaborations and to carry out substantive research that will lead in new directions." This was a tough one in the age of Zoom, but even then some collaborations were forged. However, we now know from our surveys that the rate of collaboration-forming is very much reduced in the world of Zoom compared to in-person. Not really a surprise, but we now have the data!

A wonderful feature of KITP is our flexibility to do truly unusual activities of lasting impact that are hard to achieve elsewhere. Pages 4 and 5 tell the story of Bill Paxton and his recent recognition by the American Astronomical Society with the Tinsley Prize. I first met Bill when he appeared in one of my classes many years ago. Already "retired", Bill was eager to learn graduate physics and eventually completed that curriculum and was eager to do science. Those early interactions turned into a remarkable collaboration with many in the astrophysical community that created the computational instrument called "Modules for Experiments in Stellar Astrophysics" (MESA), now used by over 1,000 astronomers worldwide.

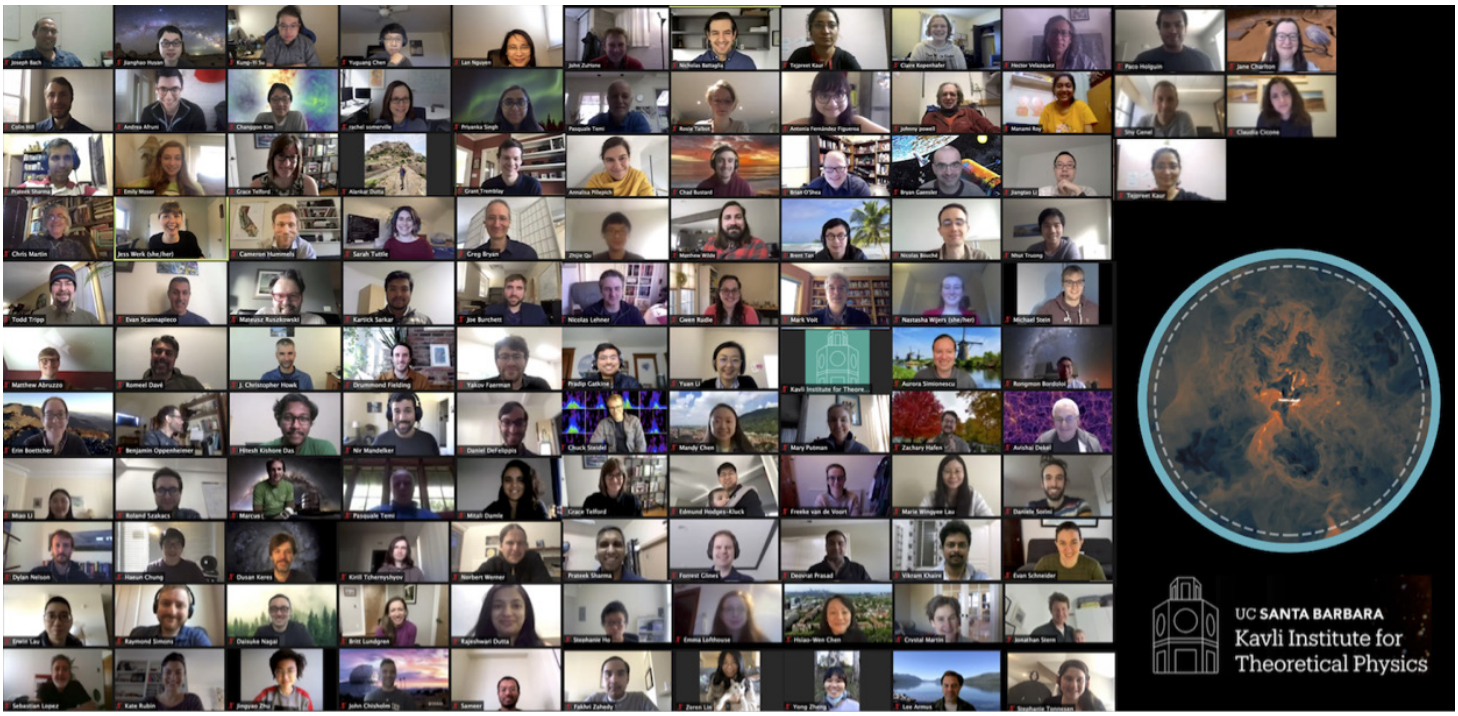
In closing, I note with deep regret the passing of Jean-Pierre Hébert, our long-standing Artist-in-Residence at KITP. Jean-Pierre's contributions to the institute are many, including stunning art throughout both Kohn Hall and the Munger Physics Residence, as well as his yearly creativity and production for our KITP Holiday cards. We miss him greatly, and I urge you to read the back page article that highlights some of his impact here at KITP, as well as the more in-depth article in our Fall 2020 Newsletter.

Stay safe, and hopefully, see you, in-person, soon!

- Lars Bildsten, KITP Director

Coming Together, Virtually

Kohn Hall may be empty, but KITP is as busy as ever



JESSICA K. WERK

Participants in KITP's Fundamentals of Gaseous Halos (AKA HALO21) virtual program

While the entire university was disrupted by the pandemic, the KITP faced a unique challenge. Its mission has always been to bring together leading scientists from around the world for in-person collaboration in the auditoriums and corridors of Kohn Hall. But for the last year the building has remained empty, as COVID-19 has made these personal interactions impossible. That said, KITP's schedule is as busy as ever, with more scientists taking advantage of its activities than at any point in the past.

"We've definitely lived through the evolution of the pandemic in different countries, different attitudes about what's possible and what's not, as well as when things will change," said Director Lars Bildsten. "And obviously it looks much different now than it did a year ago."

INITIAL RESPONSE

By fortunate coincidence, the 8-10 week programs were ending right around when lockdown began in mid March 2020. That meant the KITP could simply tell the next programs' attendees not to come.

The institute also was able to accommodate researchers who couldn't leave Santa Barbara since it operates the Charles T. Munger Physics Residence, the facility where most scientists stay when they visit. As Bildsten pointed out, "no one was coming to take the rooms."

As it happened, Deputy Director Mark Bowick was a coordinator for KITP's next program on the physics of active matter. This proved a real boon for the institute, as he could work closely with his fellow coordinators — Mike Cates (Cambridge), Nikta Fakhri (MIT), Cristina Marchetti (UC Santa Barbara), and Sriram Ramaswamy (Indian Institute of Science) — to devise creative solutions and troubleshoot emerging issues straight away.

They quickly realized that remote attendance offered a number of upsides. Not limited by physical space anymore, they could expand the invite list to 170 people — everyone who had applied to the program and more.

Program leaders worked hard to foster the sort of exchanges and questions online that happen when people are actually together in the room. One key innovation, led by participant Yair Shokef of Tel Aviv University, was a spin hour, where people were randomly split into breakout rooms with three participants. "This was meant to simulate a random discussion in the corridor or meeting someone at lunch," Bowick said.

They also introduced a Slack workspace for the program, which helped foster conversation amongst the scientists. By and large, people were very happy with the program experience, Bowick said. It far exceeded their expectations of what was possible given the circumstances, and proved to be an important first for KITP, which has since run more than ten programs this way.

KEEPING BUSY

Bowick's deep involvement in the active matter program meant that KITP had someone in-house familiar with emerging innovations. This helped when he, Bildsten and Program Manager David Kaczorowski approached the organizers of upcoming programs about how to proceed.

"It's hard," Bildsten said. "You're trying to convince future program coordinators to do something that that they were not at all planning to do."

The decisions vary. Some programs decide to cancel, especially when the planners felt that the in-person aspect was crucial to the experience, particularly since they were trying to bring together researchers in disparate fields. But for those that chose to go forward remotely, they reported that it was better than they thought it could be.

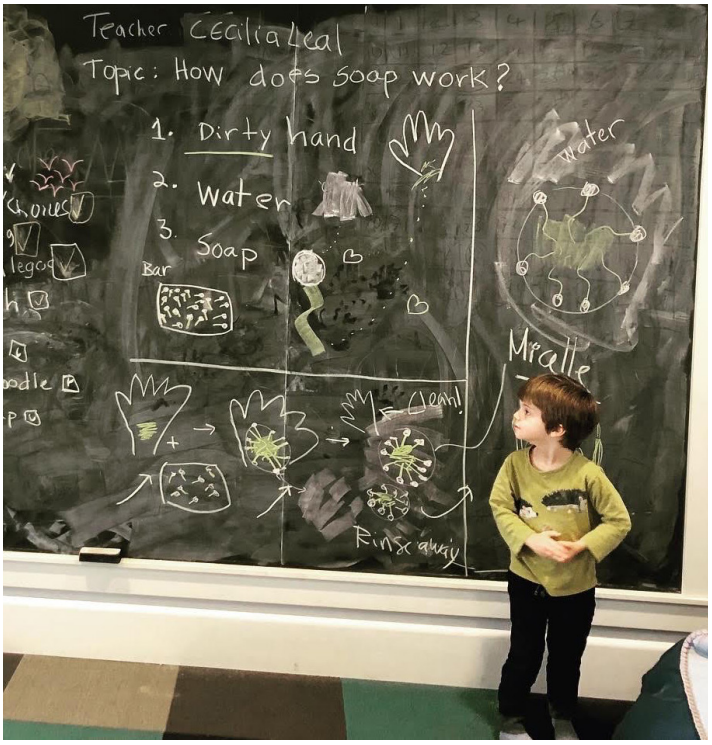
KITP staff Alina Gutierrez and Craig Kunimoto delivered these intensive Zoom events for hundreds of participants while also recording them for KITP Online Talks, the institute's archival resource of past talks.

The canceled events opened up KITP's schedule in August and October of 2020. The institute's leadership decided to contact coordinators of past programs about the possibility of returning for two-day reunion conferences. The idea was a smashing success, and KITP ended up hosting six Zoom reunion events in Summer 2020 in which over 1,000 scientists participated from 45 different countries.

For October 2020, they reached out to the institute's postdocs for proposals for short conferences. The result was six more two-day conferences. Not only were these successful events, but they proved excellent opportunities for the young researchers to learn how to plan a conference, all while guided by KITP's senior leadership.

KITP has a well-oiled system for creating balanced conferences, said Bildsten, who has overseen the institute for nearly 9 years. And there is a world of difference between attending a good conference and creating a good conference.

"Overall, the best decision was to limit the conferences to two days, and to just the morning," said David Kaczorowski. "It made it a fun, rewarding experience where people could focus very intently on a narrow topic without getting fatigued, instead of doing these long, Grateful Dead-style sets."



CECILIA LEAL

Residence families take advantage of kid-height blackboards in the Family Room for daily lessons

KITP Program Manager, David Kaczorowski

BUILDING ON WHAT WORKS

KITP has adapted and innovated throughout the pandemic, and the team has found some unexpected upsides. They plan to leverage these advantages in the future once the institute can return to in-person events.

For instance, short, virtual conferences may become more common in KITP's lineup. As both Bildsten and Kaczorowski noted, the reunion conferences would never have occurred were it not for the pandemic, and they proved to be really rewarding.

The leadership also hopes to expand participation in their normal programs via remote attendance, which they believe is achievable without detracting from the in-person experience. Future programs may offer applicants the option to apply to attend remotely. This should make the institute's events more accessible, as the team has seen over the last year. This development is also welcomed by the National Science Foundation, KITP's primary funder.

The institute has taken advantage of the remote activity to upgrade Kohn Hall's audiovisual systems and complete deferred maintenance. The building is typically only empty for two weeks a year, which makes updates and repairs difficult to schedule. A lot can be accomplished when it is empty for one year.

Kohn Hall will feature improved cameras and microphones, and the lecture halls will now have systems designed to link hearing aids to the rooms' audio systems. The team has tried to maintain the building's striking visual presence created by famous architect Michael Graves, such as spending hours matching slight variations of salmon pink paints. That said, it will look slightly different once it reopens.

Some at KITP wondered how the rising popularity of video conferencing would affect the institute. However, over the past year it has become abundantly clear how much people value the in-person experience the KITP offers.

What's been heartwarming, Bildsten said, is that coordinators and attendees are lamenting that they cannot physically come together. They also lament not seeing KITP's welcoming and able staff, who make their in-person visits so productive.

"The in-person experience isn't going to be replaced anytime in the near-term by going online," Kaczorowski said. "But at the same time, we can still provide a really great collaborative experience online for those who can't be here."

~ Harrison Tasoff, Science Writer, UCSB Public Affairs

An Accidental Astrophysicist

The American Astronomical Society honors an unlikely astrophysics leader from KITP

MIA NJE

Bill Paxton, father of the MESA software instrument, looks out from Kohn Hall

After helping to found a company like Adobe Systems and developing software like the PDF, a typical fellow might kick back and enjoy retirement for the next 40 years. Bill Paxton is far from typical. Instead of retiring, he revolutionized the field of astrophysics.

In all honesty, the veteran software designer sort of chanced upon his role as a senior fellow at KITP. But since joining KITP, he's expanded access to computational stellar astrophysics with the Modules for Experiments in Stellar Astrophysics (MESA) software instrument, a simple, open-source stellar modeling program that's kept him busy for the last decade and a half.

And now, for his contribution to the field, the American Astronomical Society has awarded Paxton the 2021 Beatrice M. Tinsley Prize. The prestigious award is conferred every two years in recognition of an outstanding research contribution to astronomy or astrophysics of an exceptionally creative or innovative character. The recipient is often a researcher who has revolutionized the field in a way that empowers other scientists to make progress.

"I'm very happy to see Bill Paxton's work celebrated with the Tinsley Prize," said AAS President Paula Szkody. "He describes himself as a computer scientist, but through his collaborations with astronomers, he has developed software without which stellar astrophysics would not be nearly as advanced as it is today.

"His inspired work on providing, maintaining and supporting the use of open-source stellar-evolution codes has seeped into the foundation of research and education efforts and given rise to an immense amount of new research across multiple subfields of astrophysics," Szkody added.

Paxton has had quite an impact on the field for someone who hadn't even heard of the Tinsley Prize until learning that he won it. "I'm not an astrophysicist," Paxton maintained. "I'm a computer scientist who has stumbled into this area."

Paxton earned his doctorate in computer science from Stanford in 1977. While working at the Stanford Research Institute in 1968, he participated in what was later dubbed The Mother of All Demos, during which researcher Douglas Engelbart previewed many features that would become staples of personal computing, including e-mail, hypertext, word processing, video conferencing, the mouse and more.

After his time at Stanford, Paxton joined the Xerox Palo Alto Research Center where he worked on a variety of emerging technologies. Moving to Adobe in 1983, he focused on developing the Type 1 font algorithms for PDF until retiring to Steamboat Springs, Colorado in 1990.

After a decade in Colorado, Paxton and his wife, Kathlyn, moved to Santa Barbara, where he continued feeding his insatiable curiosity by taking courses at UC Santa Barbara. When he sat in on then KITP Permanent Member Lars Bildsten's Stellar Structure and Evolution course, otherwise known as "Stars with Lars", he soon caught the astrophysicist's attention.

"I made a nuisance of myself to the extent that Lars eventually said, 'Why don't you start coming to my group meetings?'" recalled Paxton, who began attending the scientist's weekly research meetings. "And then Lars said, 'Why don't you think about doing a program that we can use for modeling stars?' And I started thinking about that. And then Lars said, 'Why don't you get an office here at KITP?'" Eventually, Paxton found himself in Bildsten's research group working on what would become MESA.

"I am so very pleased that Bill has received this wonderful acknowledgment from the astrophysics community recognizing more than a decade of effort he has invested in developing a computational instrument available to all," said Bildsten.

Computational astrophysics enables scientists to bridge the gap between theory and observation. "Ideally, you want to be able to run an experiment, but you can't go grab a star, run an experiment for a billion years, and come back later to see how it turned out," Paxton remarked. Computer modeling fills this need.

However, in the early 2000s, only a handful of astrophysicists were modeling stellar evolution, and most of the software was proprietary. This wasn't necessarily because researchers didn't want to share their work, Paxton explained, but rather communication was difficult in those early days of the internet.

And many of these programs were so complex as to be useless unless the creator worked down the hall and could explain it. This limited computational stellar astrophysics to just a handful of groups at a few institutions in the world.

It was against this backdrop that Paxton began designing MESA at KITP. Right away, the developer had a few criteria: The software had to be something he could run on his home computer; it couldn't take more than 30 minutes to run, on account of his short

attention span; and it had to generate pretty graphs.

These restrictions, driven purely by his own interests and desires, laid the foundation for a program that could be used by researchers around the world without a huge investment. "You can run it on a 4 GB laptop," Paxton remarked. MESA uses a simple set of physics equations to model stars as spherical shells. Since spheres are symmetrical, the program can essentially use a 1-dimensional model to simulate a 3-dimensional object, greatly simplifying computational demands.

Paxton designed MESA to be modular: built from semi-independent chunks that work together to achieve a more sophisticated result. For instance, the software has modules for opacity, nuclear reactions and equations of state, among other things. Each module can be used as a stand-alone tool depending on a researcher's needs.

Another boon of the software's simplicity and modularity is that scientists can use results from MESA as the starting point for resource-intensive 3D simulations in other models. Beefier, bespoke simulations can help physicists understand phenomena like turbulence, which don't track well in MESA's 1D model. With the resulting insights, scientists can, in turn, develop better 1D analogues of these 3D processes in MESA. In this way, the software has become the tool of choice for most stellar researchers.

Frank Timmes, an astrophysics professor at Arizona State University, remembers Paxton asking to use some of the resources on his website during MESA's early days. "An email message was unusual," recalled Timmes, who had been working on open-source astrophysics software himself. "People rarely ask, since they can just click to download."

He figured Paxton was a new graduate student in Bildsten's group who was simply being overly polite. "About three email exchanges later I recall thinking, 'Ok, this is no graduate student. Who are you?' After a little digging, my thinking became, 'This guy is a ringer!'" Timmes went on to become one of the developers on the MESA team.

"Bill's passion for excellent software and open availability has caused a renaissance in stellar astrophysics," Bildsten said. MESA has garnered over 1,000 users so far, and its ease of use has led to its adoption for teaching and assignments in more than 40 astrophysics courses. Studies that use the software have cited the MESA publications some 5,000 times, evidence of its remarkable uptake by the scientific community, he added.

While Paxton claims not to be particularly interested in any specific questions in astrophysics, he revels in creating tools that others can use to answer their questions. MESA has been a rewarding project overall, he admitted, above and beyond any joys and frustrations it brings him on a weekly basis.

A dedicated team of early-career scientists has coalesced around MESA over the past 15 years, and the stubborn senior developer has learned to turn over some control of the project to other members of the group. "MESA is going to keep going just fine without me," Paxton said. "I'm quite confident of that." That said, he plans to continue contributing to the project for as long as he can.

JAKUB OSTROWSKI

Participants at the 2018 MESA Summer School at UCSB learn how to incorporate the software into their own research

The project has received generous support from the National Science Foundation, which has enabled its continued development as well as an annual MESA summer school held at UC Santa Barbara.

Paxton is concerned, however, about the future of computational astrophysics as a whole. Software developers are not superstars in the world of astrophysics in the same way that they are in the tech industry. What's more, there's still a huge difference in salary between a position in academia and one in tech, he noted. And as software becomes more complex, the skill level required to develop tools like MESA will only increase. The field is already competing to attract talented individuals who would have no problem landing high-paying jobs elsewhere.

"I'm concerned about the health of the field in terms of finding a way not to rely on freaks like myself wandering in off the street," he said half-jokingly, "who don't need to have a salary, don't care about tenure, and are just doing this stuff for fun and willing to spend huge amounts of time supporting other users."

The community recognizes theorists for their ideas, and observational scientists for their analyses, he added, but the folks who make the computational tools to knit the two together are only starting to garner recognition for their critical contributions.

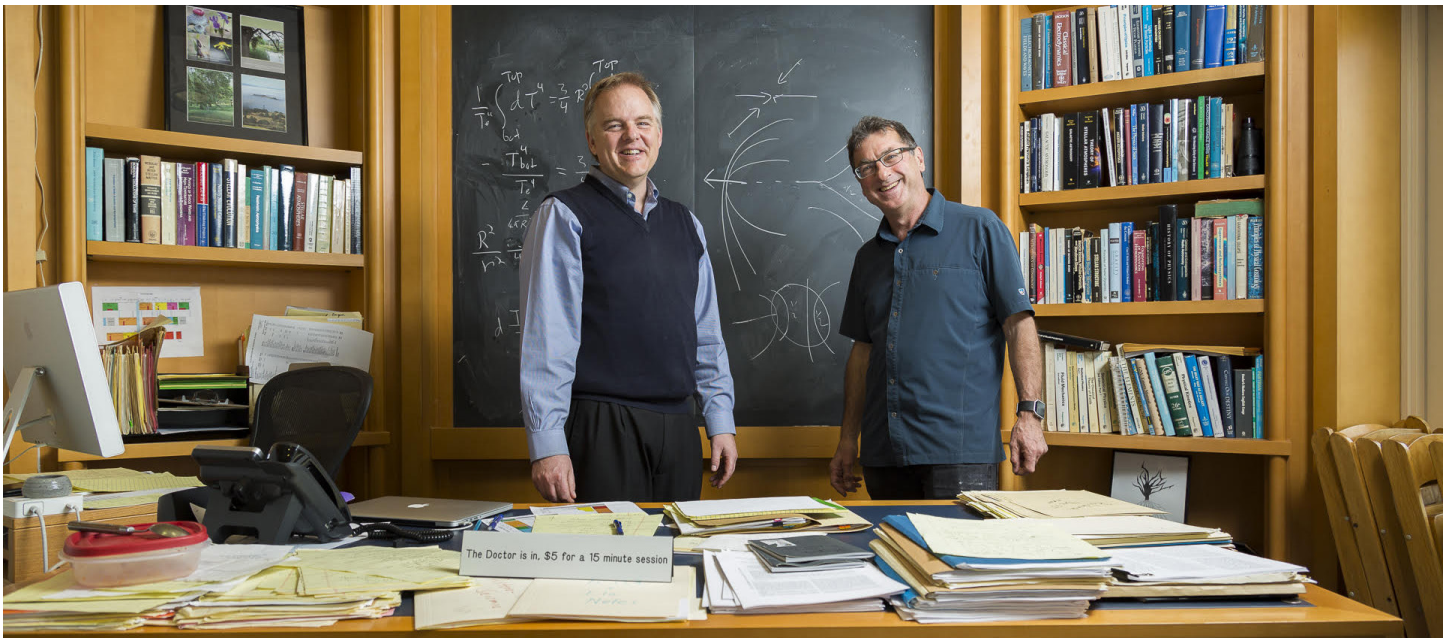
"I think a cultural change is happening," Paxton said, "and that's one thing that really is positive about receiving the Tinsley Prize: It's a step by the community towards recognizing the real value of these software developers."

Bildsten and Paxton have taken to calling programs like MESA "software instruments," according to the latter. "Just like you can't do observational astrophysics without an instrument like a telescope," he said, "you can't do computational astrophysics without an instrument such as MESA.

"The field rewards instrument builders who are creating telescopes, and they need to reward instrument builders who are creating critical software tools," Paxton continued. "Being selected for the Tinsley Prize is a step in that direction."

~ Harrison Tasoff, Science Writer, UCSB Public Affairs

The Man Behind the "Badge": Deputy Director, Mark Bowick



MATT PERKO

KITP Director Lars Bildsten and Deputy Director Mark Bowick

Our Senior Director of Development Kristi Newton interviewed KITP Deputy Director Mark Bowick this Spring to talk all things KITP. An accomplished condensed matter and high energy theorist and a Visiting Distinguished Professor in the UCSB Physics Department, Mark brings his expertise, inspiration and a great sense of humor to the role of Deputy Director.

Q: What is the role of the Deputy Director at KITP?

A: I help to curate scientific aspects of our KITP programming which is a two-year process. I vet and help to support pre-proposals from the science community, and then work with the KITP Advisory Board to develop full proposals for submissions that have the most merit. Of these, 10-12 are chosen to be our future programs. Right now we have just decided on the programs for the 2022-23 program year.

I then work with program coordinators and our KITP Program Manager David Kaczorowski to facilitate program invitation lists, which we review carefully to ensure there is diversity at multiple levels.

Together with the Director Lars Bildsten and the KITP permanent members, we then work proactively with program coordinators to ensure that programs are successful from launch to completion, and beyond. Lars and I have a planning meeting with coordinators before each program begins, to share what we have learned over the years. This helps to make programs more successful and also allows us to check on the balance between formal presentations and discussion time. I often follow how programs are doing by taking part in their formal and informal activities.

A very enjoyable part of my job is to help curate the diverse variety of outreach and community events we host in partnership with Kristi Newton and Megan Turley, our great Development Team; from "Public Lectures" for a broad audience, smaller "Chalk Talks" and coffees with scientists for our Friends of KITP and supporters, to "Café KITP" and our recently-launched "Big Ideas" series, featuring our outstanding postdocs presenting their research or sharing key ideas or challenges in their field with the community.

One of the many great things about being the Deputy Director here is that everyone at KITP is very good at what they do. It's a great team to work with and this makes my job a lot more fun!

Q: How has your role changed (if at all) because of the pandemic?

A: In March of 2020, we had to "redo" our two-year process for curating collaborative programs at KITP and switch to an online mode. We were mid-stream in planning when the pandemic hit and we had to adjust our plans quickly. We contacted all of the upcoming program coordinators and determined which programs were enthusiastic about going virtual. Participants then had to be contacted and the timetable revised.

As luck would have it, I happened to be a coordinator for the first program that went virtual a few weeks later. It was a 9-week program on Active Matter that was completely redesigned to run virtually. We were able to experiment and learn what worked and what didn't work, and to share these lessons and build on them with future online programs.

Q: What do you like most about being Deputy Director?

A: I like that the role is very broad, which fits with my having worked on a wide variety of science topics throughout my career. It's great to be able to participate in all of the aspects of science that the KITP conducts. The vast majority of the world's leading scientists come to the KITP at some point and often very frequently. I used to say (pre-Covid) that I couldn't even make it to the coffee

machine without running into a top-notch scientist! Outreach is fun and challenging, too.

Q: Tell me about your current research.

A: I am interested in how order develops and its relation to symmetry. The world around us shows us a variety of behaviors from being very ordered to very disordered, and everything in between. There are many examples of how matter transitions from being structureless to having structure associated with order.

There are also inevitable and striking irregularities in every ordered structure – from atomically thin sheets of graphene to the large-scale distribution of galaxies. These essential singularities, or defects, are often described by the field of topology in mathematics and so we call them topological defects. They were discovered in liquid crystals, such as those used in modern liquid crystal displays (LCDs), in the late 19th century. I am particularly interested in topological defects in active liquid crystals – those that locally consume energy.

I am also trying to understand what happens to ultra-thin materials, like graphene, when heated up. Their behavior when warm is profoundly different from their behavior at zero temperature and it is all controlled by temperature and geometry. It's fascinating!

Q: What inspires you?

A: The power of thought inspires me. I find it amazing that we can explain anything at all. Most of us got into science because we were curious about the world around us and wanted to figure out how things work. The power of deductive – and inductive – reasoning is striking when it actually works! But most of our work is a big puzzle. We never really know how it's going to turn out or whether there is even an answer. That can be uncomfortable, so it's a subtle balance.

Q: If you could change one thing about physicists, what would it be?

A: We physicists are not one uniform species, thank goodness! We are all really different in terms of approach, personalities and skills. As a community we could definitely be more diverse in all meanings of the term from gender to race to career-stage, and beyond. This is a big area of focus for us at KITP. We also have a fairly distinctive way of actively engaging with each other and asking probing questions that can be seen as "aggressive" or "intimidating"- this could likely be made more welcoming.

Q: Have you ever considered writing a book? If so, what would it be about?

A: Yes – I have two ideas for a book. One would be about the topological defects I mentioned earlier, emphasizing the very wild things that happen with these defects. They are found everywhere in the physical and mathematical world. The other book would be about soft matter in general—emphasizing some of the intriguing principles of soft matter that are not widely known.

Q: I've heard that you are a keen sailor - tell me your scariest or most exciting sailing story!

A: We had a collision in a race. Before you start a race everyone sails around in the harbor tuning up and gauging the wind and currents. On this day there were three of us on the boat. Our skipper was at the helm and two of us were prepping for the race and managing the sails.

All of a sudden there was a huge thump and another boat's mast crashed down on our deck along with tons of rigging. It was quite a scene! There were five people on the other boat, but somehow no one on their boat saw us, and we didn't see them either. Sails are poor windows.

Thankfully no one was hurt, although one person on the other boat did go overboard. The ironic thing is that the other boat was so badly damaged that the owner bought a new boat, which now consistently wins the races in our fleet.

Q: Finally, what does it take to run a successful program? How does KITP evaluate for and define success?

A: Despite KITP being known for its relaxed collaborative environment, nothing we do at KITP is by chance--it is all carefully considered and curated. We talk a lot to coordinators and participants about how their program is going along the way and then we have an exit interview with all coordinators and we also ask participants to provide feedback. The main question we ask is "How can we do things better? What could be improved?" It's a constant evolution. We are always looking to improve.

It will be interesting to see how the changes we have made in adapting to online programming will impact what we do in the long-term. We have learned that online programs allow us to be much more inclusive. The future is likely going to be that if scientists are not able to participate in-person and travel to Santa Barbara, we will invite them to participate virtually so we are always able to give people a way to participate. It has been amazing to see how resourceful our science colleagues have been helping us to figure out how to do things well in a virtual mode. When people are forced in to challenging constraints it generates lots of innovation!

Originally from New Zealand, Mark's natural habitat is on the water

MARK BOWICK

Jean-Pierre Hébert

(1939-2021) In Memoriam

It is with heavy hearts that we share that KITP artist in residence Jean-Pierre Hébert has passed away. He died on Sunday March 28, 2021, surrounded by his family.

Hébert combined his passions for computing and art to become a celebrated pioneer of digital artwork.

Born in Calais, France, Hébert grew up in Vence surrounded by luminaries of the modern art movement, instilling in him a sense of creativity and expression that followed him throughout his life.

Although he set out to study engineering in college, mathematics and computers — which were still in their early days — captivated the young Frenchman. He spent years working in computer science and never lost his creative drive.

In the mid-1970's, a bolt of inspiration struck Hébert while reading about the artwork of Anni Albers in an IBM brochure: He could harness computer algorithms to create works of art. The introduction of smaller, personal computers around that time made this feasible. Since then, Hébert devoted his career to exploring the bounds of computational art.

For Hébert, each piece he produced was merely one instantiation of a life-long composition. "The code I'm using now is using many parts [from back] in 1974," he once said. "I added so many layers to it, [but] I can still do the first ones."

CLAIRE HEBERT

He and his wife, Claire eventually moved to Santa Barbara, where fate brought them together with former KITP director David Gross, who was looking for artwork to adorn Kohn Hall. This quickly developed into a lasting relationship between the artist and the institute, and many of Hébert's works have come to grace Kohn Hall and the Munger Physics Residence.

The Hébert's relationship to campus extends beyond KITP. All four of their children graduated from UC Santa Barbara, one became a professional violinist, while three went on to pursue advanced degrees in physics.

Of all of his accomplishments, Hebert is most proud of his initial genius in choosing to explore a new type of art form. "I've done this drawing and that drawing, but they are all drawings, not ideas," he had said. "It was the idea of using the computational power of a computer to make a drawing that started everything."

~ Harrison Tasoff, Science Writer, UCSB Public Affairs

UC **SANTA BARBARA**
Kavli Institute for Theoretical Physics

Connect with the KITP

There are many ways to stay up to date on the exciting science happening at the institute:

- Subscribe to our Public Events Mailing List at www.kitp ucsb.edu/subscribe
- Follow us on Twitter @KITP_UCSB
- Become a Friend of KITP by making a philanthropic gift - call (805) 893-6307, visit www.kitp.ucsb.edu/support-kitp or email friends@kitp.ucsb.edu