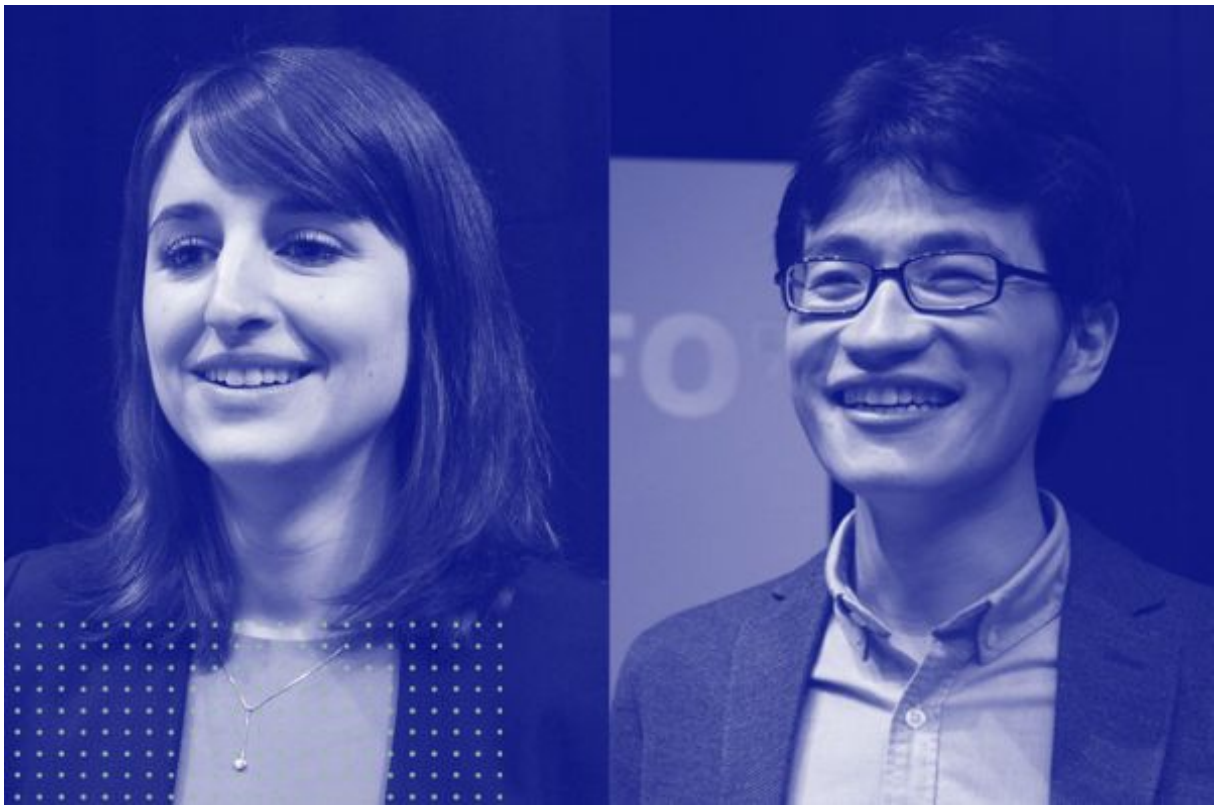

ICFO PhD Thesis Awards

Two ICFO PhD graduates awarded for their creative and ambitious research

December 21, 2020

The ICFO PhD Thesis Award distinguishes particularly brilliant PhD theses presented at ICFO. With the award, ICFO wishes to highlight and reward extraordinary PhD students whose research progress at the institute has proven to be highly creative and ambitious.

In 2019, twenty-three ICFO PhD students defended their theses at the institute. From this pool, the PhD Committee launched an in-depth deliberation to determine the recipients of the PhD Thesis Awards and is happy to award the 2019 awards to Dr Renwen Yu, in the theoretical field, and Dr. Luciana Vidas, in the experimental field.

Award Citations:

Dr Renwen Yu: ICFO recognizes the exceptional doctoral thesis i¿½Toward Next-Generati n Nanophotonic Devicesi¿½.

This thesis is impressive in the breadth and volume of topics investigated within the broad field of nanophotonics. These include significant advances in ultrafast radiative heat transfer, the plasmonic properties of ultrathin metal films, light modulation and nonlinear optical properties of graphene, novel methods of light detection, and the optical response and electrical properties of 2D materials in general. The results reflect an outstanding combination of scientific creativity, maturity, analytical skills, and knowledge across many fields. Dr. Yu's scientific productivity is evidenced by at least 22 publications during his thesis, in many top journals such as Science Advances, Nature Photonics, Nature Materials, Nature Communications, and ACS Nano, in addition to numerous collaborations. The work has attracted widespread interest and attention internationally.

Dr. Luciana Vidas: ICFO recognizes the exceptional doctoral thesis i¿½The insulator-met l phase transition in VO2 measured at nanometer length scales and femtosecond ti e scalesi¿½.

Quantum materials are attracting growing interest in condensed matter physics. Vanadium dioxide is one of the key quantum materials. Despite extensive investigations on this material and its insulator-metal phase transition, there are still many open questions. Luciana Vidas achieved important contributions in this field.

A new technique called ultrafast diffuse X-ray scattering was used to understand the dynamics of how the phase transition proceeded. She played a leading role in the international collaboration for the development of this new technique. .

Another important contribution has been in the field of soft X-ray holographic imaging where Luciana was the first to apply spectrally resolved holographic technique to image a phase transition. High spatial resolution data enabled her to gain new insights into what drives the equilibrium phase transition.

The exceptional quality of Luciana's work has received a widespread recognition by the international scientific community. These include publications in PRX, Science, Nature communication, and PRB.

The Group Leaders supervising these selected theses offer their personal congratulations.

Prof. Javier Garcia de Abajo sent his sincere congratulations to Dr. Yu. i¿½Renwen, you ha e been an extraordinary PhD student, with such a high capacity for intense work a d dedication, always providing profound insights on the physical problems on which you ha e worked during your doctoral period. As a PhD supervisor, I was continually amazed h

w efficiently and comprehensively you were completing tasks, including many that were real y challenging. I admire your pragmatism when solving problems, as well as your ability o identify, learn, and master the elements needed in each project. I also feel proud that y u have matured into a very independent scientist, as you have clearly demonstrated duri g your postdoctoral stay with us in this pandemic times. Our group (and me personally) wi l miss you enormously! I congratulate you on this well-deserved recognition for your PhD wo k and wish you all the best in your next venture as a postdoc in the US!"

Prof. Simon Wall, leader of the Ultrafast Dynamics in Quantum Solids group and supervisor of Dr. Vidas's thesis recalls, i¿½Luciana's thesis focused on a material, VO2, that has been t e source of controversy in condensed matter physics for more than 50 years. To ma e progress in this fiercely contested field Luciana's project was to develop and apply n w experimental techniques that could provide concrete, rather than speculative, insights n order to gain real understanding of this material. These projects involved using new y developed X-ray lasers at facilities in Japan and the USA. Luciana's work contributed to a publication in Science, where we showed, for the first time, that atomic disorder plays the main role in the phase transition. This turned out to be the easy part of her thesis.

Luciana also developed a new imaging technique for quantum materials that was published in Nano Letters. Our attempts to extend this technique to the time domain ultimately failed, but caused us to realize that there were some major misunderstandings in the field. Luciana took on the monumental task of providing definitive proof against some strongly and widely held beliefs in the field that had little to no evidence to back them up. Performing spectroscopic measurements from the mid-IR to soft X-rays and from the femtosecond timescale up the seconds timescale, she built a watertight case for a new understanding of the phase transition, built on solid evidence. These findings were published in Physical Review X.

Luciana showed remarkable persistence and great skill to take new experimental techniques and provide new information that will ultimately change the direction of the field. Not only that, she has been a pleasure to work with and was always willing to help out others in the lab. She has set a very high bar in the group and is a great example for the next generation of PhD students to look up to.i¿½

The entire ICFO community congratulates Renwen and Luciana for the dedication, hard work, and scientific insight that have earned them this ICFO 2019 PhD Award.

Award acceptance: Dr Luciana Vidas

Award acceptance: Dr Renwen Yu