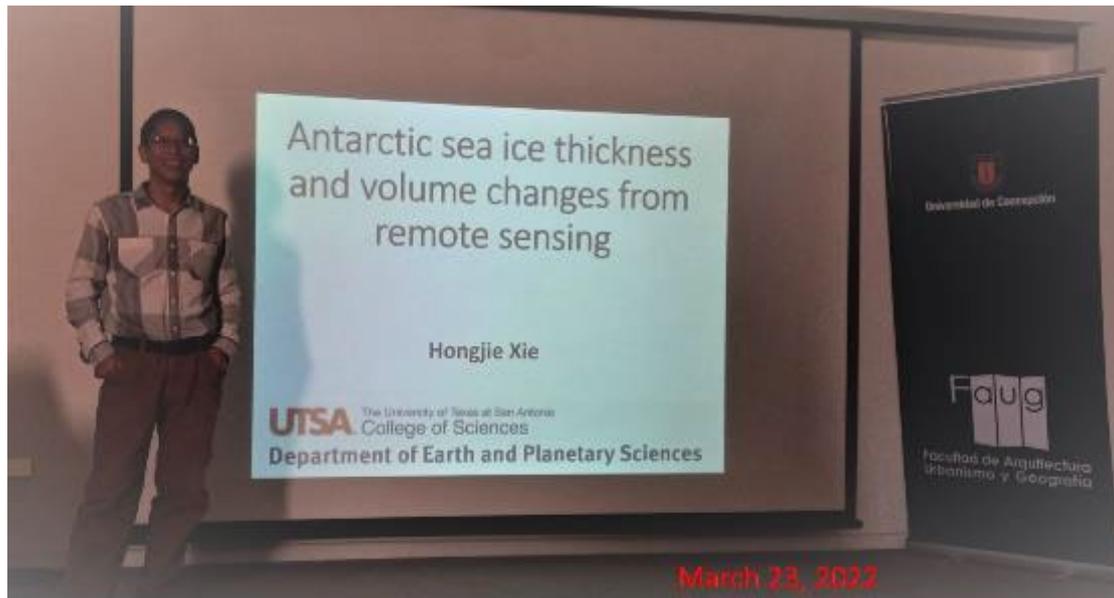




SCAR Visiting Scholar Scheme Report



By Dr. Hongjie Xie (Univ. of Texas at San Antonio)



Dr. Xie gave a research seminar at the Department of Geography, Universidad de Concepción, Chile, on March 23, 2022

Universidad de Concepción | ESCUELA DE VERANO LOEC 2023 | UTSA The University of Texas at San Antonio | MGGG | UCG | DOCTORADO EN ESTUDIOS TERRITORIALES DEL SUR GLOBAL | GIMCUP

CURSO

Voces, Imaginarios & Territorios

INTRODUCTION OF ICESAT/ICESAT-2 AND CLOUD-BASED ICESAT-2 DATA PROCESSING AND APPLICATIONS

Dicta: **DR. HONGJIE XIE**
Department of Earth and Planetary Sciences
University of Texas San Antonio (USA)

12 al 15 de enero
Idioma: Inglés

12 y 13 enero
10:00 - a 12:00 y de 14:00 a 16:00 hrs.
14 y 15 enero
válida a terreno

*Se solicita contar con una cuenta Google para trabajar con Google Earth Engine.
Para inscripción enviar correo a snavas@udec.cl

Universidad de Concepción flyer for Dr. Xie's workshop (January 12-13, 2023), followed with a glacier field work (January 14-15, 2023).

Visiting Scholar

Hongjie Xie
Professor
University of Texas at San Antonio
USA
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Host Institution

Alfonso Fernandez,
Professor,
Universidad de Concepción
Chile

Dates of Visit

First visit: March 12-25, 2022
Second visit: January 6-17, 2023

Summary of Visit

As a SCAR Visiting Scholar, I did two visits to the hosting university, Universidad de Concepción (UdeC). The purpose of my Visiting Scholar opportunity was to support the capacity building of Antarctic research and education at Universidad de Concepción, particularly on remote sensing of sea ice, ice sheet, and ice shelf, and on better understanding of Antarctica's contribution to global sea level rise. Besides meeting and talking with many students and faculty in the University, I gave one research seminar, conducted a two-day workshop, participated a glacier-study field trip, and started working on a memo of understanding for a potential exchange program between the two Universities.

The first visit (March 12-25, 2022) actually scheduled before the SCAR visiting scholar offer was notified to me, but I took advantage of this visit. Basically one week for a scheduled glacier field work with students, faculty and collaborators, and the second week for the SCAR Visiting Scholar business. Due to the covid-19 caused traveling problem, I missed the glacier field trip but my PhD student (from UTSA) did participating the field trip and collected many data for his dissertation research, with my hosting professor, Dr. Alfonso Fernandez. I had many interactions with faculty and students in the University and gave a seminar talk titled "Antarctic sea ice thickness and volume changes from remote sensing" on 3/23/2022. This was the first face-to-face research seminar that the UdeC Department of Geography had since the starting of the covid-19 pandemic back in early 2020. The seminar was also Zoomed online for those who could not come to the campus.

The second visit (1/6-1/17/2023), besides the regular discussion with faculty and students for Antarctic studies, I taught a 2-day workshop (January 12-13, 2023): "Introduction of ICESat/ICESat-2 and cloud-based ICESat-2 data processing and applications" with over 15 students and faculty participants from different programs: Geography, Geology, and Geophysics. After the workshop, I participated a glacier field trip with students and faculty (a total of 6 persons). Although I had traveled to the Arctic and Antarctic, it was my first time to step feet on a Mountain Glacier outside the polar regions. This glacier has been melted so fast, an average of 2-meter per year based on the stakes' records, with flowing surface water and deep and wide crevasses. We did check the stakes and installed new stakes, also flew a drone to map glacier, so the change of the glacier extent from time to time would be possible to be constructed. During this visit, my hosting professor and I met with the Deputy Director (Dr. Luis Parra) of the UdeC Graduate School and discussed a mutual interest on establishing a potential exchange program between the two universities. Detailed memo of understanding is being worked out, with a wishful starting day in early 2024.

Capacity Building, Education and Outreach Activities

Meet students and faculty, during the two visits, I have met and talked with most of the faculty in the hosting Department (of Geography) and many students in the department. Beyond the Department, I also visited Dr. Frank Tinapp (Aerospace Science and Technology) discussing the drone development and application for glacier and Antarctic studies; I also met with Drs. Mario Lillo and Angel García (Water Resources and Energy) discussing the hydrology and water resource studies under the extreme drought condition in the central and southern Chile.

Seminar and workshop, the research seminar I gave (March 23, 2022) during the first visit was about the Antarctic research results from remote sensing and many research topics that my group in UTSA has been working on and potential collaboration of student projects on sea ice, polynyas, surface melting of ice shelves, icebergs tracking via Google Earth Engine, etc.. The workshop I gave (Jan 12-13, 2023) mainly focused on the ICESat/ICESat-2 data processing and applications, via OpenAltimetry and Google Earth Engine (GEE). I incorporated 7 hands-on modular for students to actually do it during the workshop time, including (1) OpenAltimetry, (2) Python basics, (3) Python functions, (4) Explore GEE Python API and single imagery, (5) GEE for image collection, (6) GEE for time series of images for change detection, and (7) GEE and OpenAltimetry for ICESat-2 applications. The students have learned a lot from this two-day workshop and modular and they can directly use the codes/modular for their research applications for any region of interests.

Media and website, my award for the SCAR Visiting Scholar was listed in UTSA departmental news in February 2022 and achieved in the [Departmental record](#). The visit and field trip to glacier (2022) was also included in the 2021-2022 Departmental Newsletter's [Geo-Moments](#). The workshop and visiting the glacier in January 2023 will be also included in UTSA departmental

newsletter of 2022-2023. [My seminar talk and workshop](#) in the hosting University were also widely advertised and attended. The [recorded videos for the workshop](#) were archived in YouTube.

Exchange program, during the second visit, we discussed more details about a potential exchange program between two universities, specially the two graduate programs: UTSA's MS Geoinformatics and UdeC's MS Geography Analysis. We have met with UdeC's graduate school Deputy Director Dr. Loui Parra and made a preliminary agreement for the exchange program. Basically it will include two parts of the exchange to start with: (1) Online courses exchange between the two graduate programs and (2) One visiting student (one semester to one year) from each program per year that each University will covers the two-way airplane tickets of its student.

Special issue in remote sensing for Cryosphere, during my first visit to the UdeC in 2022, I met with Dr. Christophe Kinnard from Canada, who was also Dr. Alfonso Fernandez's guest and collaborator. Together, we initiated a special issue proposal "Remote Sensing of the global cryosphere: status, processes, and trends" to the best remote sensing Journal: Remote Sensing of Environment (RSE) and it was later accepted by RSE to start the call for paper submission in September 2022. This was a surprising achievement not planned by me (or the Visiting Scholar award) but happened due to this visit.



The image is a promotional banner for a special issue. On the left, the Elsevier logo is displayed above the text "Special Issue". Below this is a blue button with the text "Submit your paper >". In the center, there is a circular orange icon with a white sunburst pattern and a green circular graphic with a white line and a small square at the top. To the right, the title "Remote sensing of the global cryosphere: status, processes, and trends" is written in a serif font, followed by "Remote Sensing of Environment" in a smaller font. Below the title, it says "Edited by" followed by the names: Hongjie Xie, Alfonso Fernandez, Christophe Kinnard, Grant Macdonald, Guoqing Zhang, Abdelghani Boudhar, and Stef Lhermitte.

Future Plans

This SCAR scholarship has significantly strengthened my collaboration relationship with Dr. Alfonso Fernandez in UdeC. For the first time, I was able to visit his university in March 2022 and then January 2023. My PhD student visited there and participated the glacier field trip for the first time (in March 2022) as well. During the second visit (January 2023), requested by the hosting department, I prepared and taught a 2-day workshop about ICESat/ICESat-2 and cloud-based data processing and applications. I believe it was a very successful outreach to the hosting university. The entire workshop was recorded and all materials were shared with the Dr. Fernandez and participating students and can be shared with anyone showing interests and wanting to learn more. I expect to involve with a few graduate students and postdocs from UdeC for cryosphere studies using remote sensing, especially ICESat-2 data. We are still working on the Memo of Understanding (MOU) for the exchange program and hopefully it will be agreed and signed by the two universities by end of this year and to officially start in early 2024. Based on the MOU, we expect to have a few online courses to be exchanged

and at least one graduate student exchange from each university per year. My plan is to visit UdeC once every 1-2 years in the future to continue our collaborations.



Photos: A. Hongjie gave a graduate seminar at the UdeC Department of Geography (March 23, 2022); B. UdeC campus (March 24, 2022), from left to right with hosting professor Alfonso Fernandez, Hongjie Xie, collaborating professor Chris Kinnard and PhD student; C. RSE special issue co-editing by Hongjie, Alfonso, Chris, etc.; D. UdeC flyer for workshop (Jan, 2023)



Photos: E. Camping site (Jan 14, 2023); F. Morning hiking to the glacier; G. Field work on glacier (Jan 15, 2023); H. Crevasse with rolling rocks on top.