Lin Liu — Curriculum Vitae

Earth System Science Programme
Faculty of Science
The Chinese University of Hong Kong
Email: liulin@cuhk.edu.hk

Group Website: cryocuhk.github.io
Personal Website: www.cuhk.edu.hk/sci/essc/people/liu.html
ORCID: 0000-0002-9581-1337

Education

Ph.D. in Geophysics, University of Colorado at Boulder, USA — 2011
B.Sc. in Geophysics, Wuhan University, China — 2005

Research Interests

- Cryosphere Geophysics
- Geodesy
- Near Surface Geophysics
- Remote Sensing
- Interactions of the solid earth with atmosphere, ocean, and cryosphere

Honors and Awards (since graduate school)

Exemplary Teaching Award, Faculty of Science, CUHK — 2016
George Thompson Postdoctoral Fellowship, Stanford University — 2011–2013
NASA Earth and Space Science Fellowship — 2008–2011
CIRES Graduate Research Assistant Fellowship, University of Colorado — 2006–2007

Professional Experience

The Chinese University of Hong Kong (CUHK) — 2014–present
  Assistant Professor, Earth System Science Programme, Faculty of Science
  Research Fellow, Institute of Environment, Energy and Sustainability
  Research Fellow, Institute of Space and Earth Information Science
Visiting Scholar, Stanford University — 2014–present
George Thompson Postdoctoral Fellow, Stanford University — 2011–2013
Research Assistant, University of Colorado — 2006–2011

Teaching Experience

Exploring the Earth System (ESSC1000), CUHK — Fall 2016-2018
Solid Earth Dynamics (ESSC2010), CUHK — Spring 2014–2018
Applied Geophysics (ESSC4110 & EASC5110), CUHK — Fall 2017
Engineering Geology and Applied Geophysics (ESSC4110, co-taught with T.F. Wong), CUHK — Spring 2016
Remote Sensing: Principles and Applications (ESSC4540), CUHK — Fall 2014, 2016, 2018
Research Frontiers in Earth and Atmospheric Sciences (EASC5001/5002), CUHK — 2014–2018
Hydrogeology (ESSC3220, co-taught with T.F. Wong), CUHK — Fall 2014
Undergraduate Research Mentor, Stanford University — 2012–2013
Teaching Assistant, Experimental Physics, University of Colorado — 2005–2006
Teaching Assistant, Electricity and Magnetism, University of Colorado — 2005–2006

Publications

1. **Liu, L.** and K. M. Larson (2018), Decadal changes of surface elevation over permafrost area estimated using reflected GPS signals, *The Cryosphere*, 12, 477–489, doi:10.5194/tc-12-477-2018.
2. Hu, Y., **L. Liu**, K. M. Larson, K. M. Schaefer, J. Zhang, and Y. Yao (2018), GPS Interferometric Reflectometry reveals cyclic elevation changes in thaw and freezing seasons in a permafrost area (Barrow, Alaska), *Geophysical Research Letters*, 45, 5581–5589, doi:10.1029/2018GL077960.
3. Ran, J., Vizcaino, M., Ditmar, P., van den Broeke, M. R., Moon, T., Steger, C. R., Enderlin, E. M., Wouters, B., Nol, B., Reijmer, C. H., Klees, R., Zhong, M., **L. Liu**, and Fettweis, X. (2018) Seasonal mass variations show timing and magnitude of meltwater storage in the Greenland ice sheet, *The Cryosphere*, in press.
4. Chen, J., Günther, F., Grosse, G., **Liu, L.**, and Lin, H. (2018), Sentinel-1 InSAR measurements of surface elevation changes over yedoma uplands on Sobo-Sise Island, Lena Delta, *Remote Sensing*, 10(7), 1152, doi:10.3390/rs10071152.
5. Schuster, P. F., K. M. Schaefer, G. R. Aiken, R. C. Antweiler, J. F. Dewild, J. D. Gryziec, A. Gusmeroli, G. Hugelius, E. Jafarov, D. P. Krabbenhoft, **L. Liu**, N. Herman-Mercer, C. Mu, D. A. Roth, T. Schaefer, R. G. Striegl, K. P. Wickland, and T. Zhang (2018), Permafrost stores a globally significant amount of mercury, *Geophysical Research Letters*, 45, 1463–1471, doi:10.1002/2017GL075571.
6. Wu, Z., L. Zhao, **L. Liu**, L. Tian, R. Zhu, H. Zhou, Z. Gao (2018), Surface deformation monitoring in the permafrost regions over Tibetan Plateau using Sentinel-1 data, *Sciences in Cold and Arid Regions*, 10(2), 114–125, doi:10.3724/SP.J.1226.2018.00114.
7. Jafarov E., A. D. Parsekian, K. Schaefer, **L. Liu**, A. Chen, S. Panda, T. Zhang (2018), Estimating active layer thickness and volumetric water content from ground penetrating radar measurements in Barrow, Alaska, *Geoscience Data Journal*, 4, 72–79, doi:10.1002/gdj3.49.
8. Zhang, B. **L. Liu**, S. A. Khan, T. van Dam, E. Zhang, and Y. Yao (2017), Transient variations in glacial mass near Upernavik Isstrøm (west Greenland) detected by the combined use of GPS and GRACE data, *Journal of Geophysical Research: Solid Earth*, 122, 10,626–10,642, doi:10.1002/2017JB014529.
9. **Liu, L.**, S. A. Khan, T. van Dam, J. H. Y. Ma, and M. Bevis (2017), Annual variations in GPS-measured vertical displacements near Upernavik Isstrøm (Greenland) and contributions from surface mass loading, *Journal of Geophysical Research: Solid Earth*, 122, 677–691, doi:10.1002/2016JB013494.
10. Wang, X., **L. Liu**, L. Zhao, T. Wu, Z. Li, and G. Liu (2017), Mapping and inventorying active rock glaciers in the northern Tien Shan of China using satellite SAR interferometry, *The Cryosphere*, 11, 997–1014, doi:10.5194/tc-11-997-2017.
11. Iwahana G., M. Uchida, **L. Liu**, W. Gong, F. Meyer, R. Guritz, T. Yamanoguchi, and L. Hinzman (2016), Field evidence and InSAR detection of thermokarst after a tundra wildfire, using ALOS-PALSAR, *Remote Sensing*, 8(3), 218, doi:10.3390/rs8030218.
12. Chen, A., A. Parsekian, K. Schaefer, E. Jafarov, S. Panda, **L. Liu**, T. Zhang, and H. Zebker (2016), Ground-penetrating radar-derived measurements of active-layer thickness on the landscape scale with sparse calibration at Toolik and Happy Valley, Alaska, *Geophysics*, 81(2), H1-H11, doi:0.1190/geo2015-0124.1.
13. **Liu, L.**, Schaefer, K., Chen, A., Gusmeroli, A., Zebker, H. A., and Zhang, T. (2015), Remote sensing measurements of thermokarst subsidence Using InSAR, *Journal of Geophysical Research: Earth Surface*, 120, 1935–1948, doi:10.1002/2015JF003599.
14. Jones, B. M., G. Grosse, C. D. Arp, E. Miller, **L. Liu**, D. J. Hayes, and C. F. Larsen (2015), Recent Arctic tundra fire initiates widespread thermokarst development, *Scientific Reports*, 5:15865, doi:10.1038/srep15865.
15. Schaefer, K., **L. Liu**, A. Parsekian, E. Jafarov, A. Chen, T. Zhang, A. Gusmeroli, H. A. Zebker, and T. Schaefer (2015), Remotely Sensed Active Layer Thickness (ReSALT) at Barrow, Alaska using Interferometric Synthetic Aperture Radar, *Remote Sensing*, 7, 3735–3759, doi:10.3390/rs70403735.

16. Gusmeroli, A., **L. Liu**, T. Zhang, K. Schaefer, T. Schaefer, and G. Grosse (2015), Active layer stratigraphy and organic layer thickness at a thermokarst site in Arctic Alaska identified using Ground Penetrating Radar, *Arctic Antarctic and Alpine Research*, 47(2), 195–202, doi:10.1657/AAAR00C-13-301.

17. **Liu, L.**, E. Jafarov, K. Schaefer, B. M. Jones, H. Zebker, C. Williams, J. Rogan, and T. Zhang (2014), InSAR detects increase in surface subsidence caused by an Arctic tundra fire, *Geophysical Research Letters*, 41, 3906–3913, doi:10.1002/2014GL060533.

18. **Liu, L.**, Schaefer, K., Gusmeroli, A., Grosse, G., Jones, B. M., Zhang, T., Parsekian, A. D., and Zebker, H. A (2014), Seasonal thaw settlement at drained thermokarst lake basins, Arctic Alaska, *The Cryosphere*, 8, 815–826, doi:10.5194/tc-8-815-2014.

19. Khan, S. A., K. H. Kjær, M. Bevis, J. L. Bamber, J. Wahr, K. K. Kjeldsen, A. A. Bjørk, N.J. Korsgaard, L. A. Stearns, M. R. Broeke, **L. Liu**, N. K. Larsen, I. S. Muresan (2014), Sustained mass loss of the Northeast Greenland ice sheet triggered by regional warming, ***Nature Climate Change***, 4, 292–299, doi:10.1038/nclimate2161.

20. Mu. C, T. Zhang, P. F Schuster, K. Schaefer, K. P. Wickland, D. A. Repert, **L. Liu**, and G. Cheng (2014), Carbon and geochemical properties of cryosols on the North Slope of Alaska, *Cold Regions Science and Technology*, 100, 59–67, doi:10.1016/j.coldregions.2014.01.001.

21. **Liu, L.**, C. Millar, R. Westfall, and H. Zebker (2013), Surface motion of active rock glaciers in the Sierra Nevada, California, USA: inventory and a case study using InSAR, *The Cryosphere*, 7, 1109-1119, doi:10.5194/tc-7-1109-2013.

22. Parsekian, A., G. Grosse, J. Walbrecker, M. Muller-Petke, K. Keating, **L. Liu**, B. Jones, and R. Knight (2013), Detecting unfrozen sediments below thermokarst lakes with Surface Nuclear Magnetic Resonance, *Geophysical Research Letters*, 40, 1–6, doi:10.1002/grl.50137.

23. Wahr, J., S. A. Khan, T. Van Dam, **L. Liu**, J. H. van Angelen, M. R. van den Broeke, and C. M. Meertens (2013), The use of GPS horizontals for loading studies, with applications to northern California and southeast Greenland, *Journal of Geophysical Research: Solid Earth*, 118, 1795–1806, doi:10.1002/jgrb.50104.

24. Nielsen, K., S. A. Khan, G. Spada, J. Wahr, M. Bevis, **L. Liu**, and T. Van Dam (2013), Vertical and horizontal surface displacements near Jakobshavn Isbræ driven by melt-induced and dynamic ice loss, *Journal of Geophysical Research: Solid Earth*, 118, 1837–1844, doi:10.1002/jgrb.50145.

25. **Liu, L.**, J. Wahr, I. Howat, S. A. Khan, I. Joughin, and M. Furuya (2012), Constraining ice mass loss from Jakobshavn Isbræ (Greenland) using InSAR-measured crustal uplift, *Geophysical Journal International*, 188: 994–1006, doi:10.1111/j.1365-246X.2011.05317.x.

26. **Liu, L.**, K. Schaefer, T. Zhang, and J. Wahr (2012), Estimating 1992–2000 average active layer thickness on the Alaskan North Slope from remotely sensed surface subsidence, *Journal of Geophysical Research: Earth Surface*, 117, F01005.

27. **Liu, L.**, T. Zhang, and J. Wahr (2010), InSAR measurements of surface deformation over permafrost on the North Slope of Alaska, *Journal of Geophysical Research: Earth Surface*, 115, F03023.

28. Khan, S. A., **L. Liu**, J. Wahr, I. Howat, I. Joughin, T. Van Dam, and K. Fleming (2010), GPS measurements of crustal uplift near Jakobshavn Isbræ due to glacial ice mass loss. *Journal of Geophysical Research: Solid Earth*, 115, B09405, doi:10.1029/2010JB007490.

29. Shen W., **L. Liu**, and J. Ning (2007), The inner core's super rotation and its influences on the gravity field, *Chinese Journal of Geophysics* (in Chinese), 50(2), 430–436.

Published Data Products:

30. **Liu, L.**, K. M. Larson (2018), Surface elevation changes near Barrow (Alaska) measured using reflected GPS signals. PANGAEA, https://doi.pangaea.de/10.1594/PANGAEA.885935

31. Zhang, B., **L. Liu**, S. A. Khan, T. van Dam, E. Zhang, and Y. Yao (2017), GPS and GRACE inferred uplifts and extracted transient and seasonal signals due to glacial mass change near Upernavik Isstrøm, PANGAEA, https://doi.org/10.1594/PANGAEA.880159

32. Wang, X., **L. Liu**, L. Zhao, T. Wu, Z. Li, and G. Liu (2017), An inventory of active rock glaciers in the northern Tien Shan of China compiled using satellite SAR interferometry, PANGAEA, https://doi.pangaea.de/10.1594/PANGAEA.874616

33. Jafarov, E., A. Parsekian, K. Schaefer, **L. Liu**, A. Chen, S.K. Panda, and T. Zhang (2016), Pre-ABoVE: Active Layer Thickness and Soil Water Content, Barrow, Alaska, 2013. ORNL DAAC, Oak Ridge, Tennessee, USA. http://dx.doi.org/10.3334/ORNLDAAC/1355

34. Chen, A., A. Parsekian, K. Schaefer, E. Jafarov, S.K. Panda, **L. Liu**, T. Zhang, and H.A. Zebker. 2015. Pre-ABoVE: Ground-penetrating Radar Measurements of ALT on the Alaska North Slope. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. http://dx.doi.org/10.3334/ORNLDAAC/1265

35. **Liu, L.**, K. Schaefer, A. Chen, A. Gusmeroli, E. Jafarov, S. Panda, A. Parsekian, T. Schaefer, H. A. Zebker, T. Zhang. 2015. Pre-ABoVE: Remotely Sensed Active Layer Thickness, Barrow, Alaska, 2006-2011. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. http://dx.doi.org/10.3334/ORNLDAAC/1266

36. **Liu, L.**, K. Schaefer, A. Chen, A. Gusmeroli, E. Jafarov, S. Panda, A. Parsekian, T. Schaefer, H. A. Zebker, T. Zhang. 2015. Pre-ABoVE: Remotely Sensed Active Layer Thickness, Prudhoe Bay, Alaska, 1992-2000. Data set. Available on-line [http://daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, USA. http://dx.doi.org/10.3334/ORNLDAAC/1267

Other Publications (non-peer reviewed):

37. Panda S., K. Schaefer, **L. Liu**, E. Jafarov, A. Parsekian, A. Chen, Connecting lake area change, ground subsidence and permafrost carbon dynamics in Prudhoe Bay, Changing Ice: A Newsletter of Cryosphere Research in Alaska, December 2015.

38. **Liu, L.** (2015) Melting Glaciers in High Asia and their Impacts on Water Sustainability, CUHK Sustainable Campus, No 10, October 2015.

39. Contributing author to Bartsch et al. (2014) Requirements for Monitoring of Permafrost in Polar Regions: A community white paper in response to the WMO Polar Space Task Group.

40. **Liu, L.**, C. Millar, R. Westfall, and H. Zebker (2013), Taking a Census of California Rock Glaciers from Space, Mountain Views, Volume 7, No 2, November 2013.

41. **Liu, L.**, (2011), Studying changes in the cryosphere using radar interferometry: permafrost surface subsidence and glacial unloading deformation, *PhD thesis*, University of Colorado.

42. **Liu, L.**, T. Zhang, K. Schaefer, and J. Wahr, InSAR Observations Revealed Surface Subsidence Over Permafrost in Northern Alaska, Alaska Satellite Facility News and Notes, 2011 Spring Volume.

Papers in review:

43. Chen, J., **L. Liu**, T. Zhang, B. Cao, H. Lin, Using PSInSAR to map and quantify permafrost thaw subsidence: a case study of Eboling Mountain on the Qinghai-Tibet Plateau, submitted to *Journal of Geophysical Research: Earth Surface*.

44. Huang, L., **L. Liu**, T. Zhang, and L. Jiang, Automatic mapping of thermokarst landforms from remote sensing images using deep learning: A case study in the Northeastern Tibetan Plateau, submitted to *Remote Sensing*.

45. Zhou, Z. **L. Liu**, L. Jiang, W. Feng, S. V. Samsonov, Using long-term SAR backscatter data to monitor post-fire vegetation recovery in tundra environment, submitted to *Remote Sensing of Environment*.

46. Zhang, B., E. Zhang, **L. Liu**, S. A. Khan, T. Van Dam, Y. Yao, M. Bevis, V. Helm, Geodetic measurements characterize the short-term changes of glacial mass near Jakobshavn Isbræ (Greenland) from 2007 to 2017, submitted to *Earth and Planetary Science Letters*.

47. Chen, X. **L. Liu**, A. Bartsch, Detecting soil freeze/thaw onsets in Alaska using SMAP and ASCAT data, submitted to *Remote Sensing of Environment*.

48. Chen, J., K. Schaefer, **L. Liu**, R. Michaelides, H. Zebker, The use of spaceborne InSAR for monitoring the active layer terrestrial water storage and freeze-thaw cycle at Toolik, Alaska, submitted to *Geophysical Research Letters*.

49. R. J. Michaelides, H. A. Zebker, K. Schaefer, A. Parsekian, **L. Liu**, J. Chen, S. Natali, S. Ludwig, and S. Schaefer, Inference of the Impact of Wildfire on Active Layer Thickness in a Discontinuous Permafrost region using Interferometric Synthetic Aperture Radar (InSAR), submitted to *Environmental Research Letters*.

Active Research Projects

1. GNSS-RECIPE: Global Navigation Satellite System Reflectometry Studies of Elevation Changes in Permafrost Areas (PI, Hong Kong Research Grants Council General Research Grant) 2019–present
2. Kinematics and dynamics of active rock glaciers in western China (PI, Hong Kong Research Grants Council General Research Grant) 2018–present
3. Earth observation to investigate the characteristics and changes of the cryosphere in High Mountain Asia (Co-I, NRSCC/ESA Dragon 4 Programme) 2016–present
4. Investigation of characteristics and mechanism of earthquakes associated with the Hutubi gas reservoir (Co-I, Hong Kong Research Grants Council NSFC/RGC Joint Research Scheme) 2016–present
5. Radar remote sensing investigations on thermokarst dynamics on the Qinghai-Tibet Plateau, China (PI, Hong Kong Research Grants Council General Research Grant) 2016–present

Completed Research Projects

1. Mass Balance of Greenland Outlet Glaciers: Non-secular Variations From Space Geodetic Measurements (PI, Hong Kong Research Grants Council Early Career Scheme Grant) 2015–2018
2. The combined use of L- and P-band radar to retrieve active layer thickness over Arctic permafrost (PI, CUHK Direct Grant for Research) 2017–2018
3. Synergistic investigations of surface deformation in permafrost areas using field and remote sensing observations (Co-PI, Hong Kong Research Grants Council Germany/Hong Kong Joint Research Scheme) 2016–2017
4. Radar Remote Sensing and Field Investigation of Permafrost Changes in Svalbard (PI, CUHK Direct Grant for Research) 2014–2015
5. Remotely-Sensed Active Layer Thickness (ReSALT) product derived from InSAR data over North American Arctic regions (Co-I, NASA Terrestrial Ecology Program) 2013–2016
6. Collaborative Research: Exploring the Dynamics of the Active Layer and Near-surface Permafrost across the North Slope of Alaska (Co-I, NSF Arctic Natural Science Program) 2012–2015

Field Experience

Field study of alpine permafrost on the Qinghai-Tibet Plateau 2014–2018

Field study of permafrost and rock glaciers in northern Norway and Svalbard 2015

Field geophysical study of active layer and permafrost on the North Slope of Alaska 2009, 2012–2014

Surface Nuclear Magnetic Resonance study of thermokarst lakes in Fairbanks, Alaska 2012

Field study of structural geology in Canyonlands and Arches National Parks, Utah 2005

University, College, and Department Services

Member, Search committee of assistant and associate professors, Earth System Science, CUHK 2018

Member, Review panel of Maser of Science in GeoInformation Science, CUHK 2017

Institutional representative for CUHK, UNAVCO and WInSAR 2015-present

Member, Search committee of lecturer, Earth System Science, CUHK 2015

Department coordinator, Chung Chi College, CUHK 2015-present

Member, Undergraduate committee, Earth System Science Programme, CUHK 2014–present

Member, Graduate committee, Graduate Division of Earth and Atmospheric Sciences, CUHK 2014–present

Library committee, Earth System Science Programme, CUHK 2014

Professional Services

Reviewer for *Journal of Geophysical Research*, *Geophysical Research Letters*, *Remote Sensing of Environment*, *Remote Sensing*, *IEEE Trans. on Geoscience and Remote Sensing*, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, *The Cryosphere*, *Soil Science Society of America Journal*, *Earth Surface Processes and Landforms*, *International Journal of Geographical Information Science*, *Scientific Reports*, US National Science Foundation, Netherlands Space Office, Hong Kong Research Grants Council.

Scientific Committee Member
- 5th International Workshop on Rock Physics 2019
- The 2nd international conference of Digital Belt and Road (DBAR 2017) & The 3rd international conference on remote sensing applications in tropical and subtropical areas (RSATSA 2017) 2017
- The 3rd International Conference on Sensors and Models in Photogrammetry and Remote Sensing 2015
- The 8th World Chinese Geosciences Congress 2015

Team member
- International Permafrost Association Action Group on Permafrost Subsidence 2018
- International Permafrost Association Action Group on Rock Glacier Inventories and Kinematics 2018
- Vulnerability of Permafrost Carbon Research Coordination Network 2012–present

Session convener and co-chair for international meetings
- Recent Advances in SAR Technology for Earth Observation AGU Meeting 2016
- Scientific Exploration of the Earth with Multi-modal Remote Sensing: InSAR and the New Sentinel-3 Mission AGU Meeting 2015
- Advances in InSAR Data Processing for Earth System Applications AGU Meeting 2014
- Advances in Geophysical Characterization of Permafrost Systems AGU Meeting 2013

Judge for the Outstanding Student Paper Awards, AGU Fall Meetings 2011–2016

Member of thesis defense committee: WANG Xiaowen and DAI Keren (Southwest Jiaotong University, Faculty of Geosciences and Environmental Engineering), 2017

Research Students Supervised

CUHK Postgraduates: Joseph H.Y. MA, Jie CHEN, Xiyu CHEN, Enze ZHANG, Lingcao HUANG, Yan HU, Jiahua ZHANG

Postdocs: Bo HU (2015), Zhiwei ZHOU (2016-17), Bao ZHANG (2017-18), Jiangjun Ran (2018-present)

CUHK Undergraduates (22+ in the past 4 years)

Outreach Activities

Exhibition on permafrost carbon feedbacks, Hong Kong Jockey Club Museum of Climate Change 2017-

Discussion panelist, public screening of 'Ice and the sky' 2015

Public talk on the Arctic 2014–2017
- Hong Kong Jockey Club Museum of Climate Change
- 13th Lau Oi Wah Memorial Science Lecture Series
- CUHK Knowledge Enrichment Programme for Secondary School Students

Interviewed with *Radio and Television Hong Kong* on global climate change 2014

Interviewed with *Headline Daily* on Greenland and sea level change 2014