Romain Millan | PhD

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Romain Millan is a French PhD student working at the University of California, Irvine under the supervision of Professor **Eric Rignot**. He received a master degree in Solid Earth from the University of Strasbourg and a master degree in Earth System Science from the University of California, Irvine. He also graduated from the E.O.S.T geophysics engineering school in Strasbourg and from a DEUG degree in Mathematics and Physics at the University of Avignon. Romain Millan has worked in research laboratories both in Europe and the United States and acquired experience in satellite and airborne remote sensing of glaciers.

Research Interests

Glaciology	Mass balance	Ice dynamic
Ice velocity	Bedrock topography	DEM differencing
Radar interferometry	Optical Imagery	Airborne gravity inversion

Education

- **University of California Irvine** — Irvine, USA
  PhD Candidate in Earth System Sciences (Supervisor: E. Rignot) — *2015 – present*
  - **PhD title**: Ice-ocean transition and dynamics of glaciers and Ice Sheets from Satellite and Airborne Data.

- **University of California Irvine** — Irvine, USA
  Master degree in Earth System Sciences — *2015 – 2016*
  - Main courses: Global Physical Climatology, Geoscience Modeling and Data Analysis, Ocean processes, Atmospheric Chemistry and Physics, Geophysical Fluid Dynamics, Land processes.

- **University of Strasbourg** — Strasbourg, France
  Master degree in Solid Earth and Planetary Sciences — *2013 – 2014*
  - Main courses: Remote sensing, Earth Deformation, Paleoseismology, Seismology

- **Ecole et Observatoire des Sciences de la Terre** — Strasbourg, France
  Engineering diploma in Geophysics — *2011 – 2014*
  - Main courses: Geodesy, Potential Methods, Seismic, Rocks Physics, Stratigraphy, acquisition and processing of geophysical data, field and laboratory work.

- **Universite d'Avignon et des Pays du Vaucluse** — Avignon, France
  2 years of Bachelor degree in Mathematics and Physics (DEUG diploma) — *2009 – 2011*
  - Intensive preparatory courses for competitive examinations to enter French engineering Schools.

Research Experience

- **University of Copenhagen** — Copenhagen, Denmark
  Advisors: A. A. Bjørk (Copenhagen University) — *Mar.-May 2017*
  - Digitization, orthorectification, georeferencing and ice velocity calculation using aerial images of Greenland spanning the period 1940-1970.

- **University of California, Irvine** — Irvine, USA
  Advisors: E. Rignot (UCI, JPL-Pasadena), J.Mouginot (UCI) — *Sep.-Mar. 2015*
  - Ice dynamics of the glaciers from Queen Elizabeth Islands from remote sensing observation. Processing of ALOS-PALSAR, RADARSAT, ERS and LANDSAT data, speckle-tracking, InSAR, grounding line mapping.

- **LISTIC - LEGOS** — Annecy, France
  Advisors: E. Trouvé (LISTIC), E. Berthier (LEGOS) — *Feb.-June 2014*
  - Production of high-resolution Digital Elevation model using TanDEM-X SAR data for the observation of glaciers thickness changes in the Chamonix-Mont-Blanc area (DInSAR GAMMA-rs, DEM differencing). Ref: [*Millan et al.,* 2015; *Dehecq et al.*, 2016]

- **Earthquake Engineering Research Center (EERC)** — Selfoss, Iceland
  Advisor: B. Halldorsson — *July-Aug. 2013*
  - Parameterization of ICEARRAY Recordings of the Aftershock Sequence following the 29 May 2008 M6.3 Olfus Earthquake in South Iceland

- **Institut de Physique du Globe (IPGS)** — Strasbourg, France
  Advisor: N.Gourmelen, A.Dehecq — *Jan.-June 2013*
  - Calculation of ice velocity of glaciers of the Karakoram range using pairs of Landsat images between 1970 and present (cross-correlation, IMCORR, automatic computation of center-flow-line).

Field Experience

- **Northeast Greenland:** Monitoring of Zachariae Isstrøm glacier — *Aug. 2017*
  Installation of GPS, AWS, tide gauge and AXCTDs in the fjord.

- **Northeast Greenland:** Monitoring of Zachariae Isstrøm glacier — *Aug. 2016*
  Installation of GPS and automatic weather stations (AWS) on ice.

- **West Greenland:** Monitoring of Kangilerngata Sermia glacier — *June-July 2016*
  Deployment of ground radar interferometer, CTD and tide gauge meansurements.

- **Moscow Russia:** Monitoring of an aquifer in Alexandrovka — *June 2013*
  Deep electrical, magnetic and seismic methods.

- **Understanding the geology from the Jura to the French Alps** — *May 2012/13*
  Cartography, Structural Geology, Sedimentology, Tectonic interpretation.

Teaching Experience

- **Earth System Sciences 19, Oceanography** — Irvine, USA
  Faculty advisor: J. Ferguson — *Winter 2018*
  - Organize discussions and activities in the field of oceanography at a bachelor level.

- **Earth System Sciences 19, Modeling the Earth** — Irvine, USA
  Faculty advisor: M. Prather — *Fall 2017*
  - Design laboratory activities in Earth System Sciences field such as sea ice modelling, population growth, greenhouse gases...

- **Earth System Sciences 19, Modeling the Earth** — Irvine, USA
  Faculty advisor: M. Morlighem — *Winter 2016*
  - Design laboratory activities in Earth System Sciences field such as sea ice modelling, population growth, greenhouse gases... Teaching of an ice core class.

Supervision Experience

- **Supervision of a 6 months internship (Tara Harder)** — Irvine, USA
  School: UC, Irvine — *Oct.-Mar. 2017/18*
  - Design a processing chain to calculate ice velocity fields from historical aerial images (1930-1970)

- **Supervision of a 6 months internship (Valentin Martineau)** — Irvine, USA
  School: Ecole Centrale, Paris — *Jan.-June 2017*
  - Design of processing chain to invert gravity data in the Patagonian ice field.

- **Supervision of a 6 months internship (Vincent Bernier)** — Irvine, USA
  School: Ecole Centrale, Paris — *Jan.-June 2016*
  - Design of processing chain to invert gravity data in Antarctica.

Skills

- **Computing**
  - Programming language: IDL (expert), Python (expert), Matlab (expert), Bash (intermediate), C (basic).
  - Operating System: Linux (expert), Macintosh (expert), Window (expert)
  - Other: LaTeX(expert), Microsoft Office (expert)
- **Geophysical Devices**
  - Ground Penetrating Radar, Magnetometer, Gravimeter, Electric, Seismic.
  - Installation of Automatic Weather Stations on ice in a polar environment
  - Installation of permanent Global Positioning System stations on ice in a polar environment

- **Languages**
  - French: native language
  - English: fluent
  - Spanish: proficient (8 years)

Awards and Fellowships

- Best Research Master Thesis of the Région Alsace (*e* 700 reward)
- Jenkins Family Graduate Fellowship
- University of California, Irvine Student Spotlight (https://www.grad.uci.edu/spotlights/student/romainmillan.php)

Others

- Reviewer for *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (J-STARS)*
- Co-organizer of NASA's Operation Icebridge Meeting (June 20, Irvine, CA, 2017)
- Co-organizer of NASA's Ocean Melting Greenland Meeting (June 21, Irvine, CA, 2017)

List of Publications

R. Millan, E. Rignot, J. Mouginot, M. Wood, A. A Bjørk, M. Morlighem (2018), Vulnerability of Southeast Greenland glaciers to warm Atlantic water from Operation Icebridge and Ocean Melting Greenland data, *Geophysical Research Letters*, [**accepted in GRL**].

L. An, E. Rignot, J. Mouginot, **R. Millan** (2017), A century of stability of Avannarleq and Kujalleq glaciers, West Greenland, explained using high-resolution airborne gravity and other data, *Geophysical Research Letters*, doi:10.1002/2018GL077204.

J. Mouginot, E. Rignot, B. Scheuchl, **R. Millan**, (2017), Comprehensive Annual Ice Sheet Velocity Mapping Using Landsat-8, Sentinel-1, and RADARSAT-2 Data, *Remote Sensing*, *9*(4), 364, doi:10.3390/rs9040364.

M. Morlighem,..., **R. Millan**,..., (2017), BedMachine v3: Complete bed topography and ocean bathymetry mapping of Greenland from multi-beam echo sounding combined with mass conservation, *Geophysical Research Letters*, *9*(4), 364, doi: 10.1002/2017GL074954.

L. An, E. Rignot, S. Elieff, M. Morlighem, **R. Millan**, J. Mouginot, D. M. Holland, D. Holland, J. Paden, (2017), Bed elevation of Jakobshavn Isbræ, West Greenland, from high-resolution airborne gravity and other data, *Geophysical Research Letters*, doi:10.1002/2017GL073245.

R. Millan, J. Mouginot, E. Rignot (2017), Mass budget of the glaciers and ice caps of the Queen Elizabeth Islands, Canada, from 1991 to 2015, *Environmental Research Letters*, *12*(2), doi:10.1088/1748-9326/aa5b04.

R. Millan, E. Rignot, V. Bernier, M. Morlighem, P. Dutrieux (2017), Bathymetry of the Amundsen Sea Embayment sector of West Antarctica from Operation IceBridge gravity and other data, *Geophysical Research Letters*, doi: 10.1002/2016GL072071.

A. Dehecq, **R. Millan**, E. Berthier, N. Gourmelen, E. Trouvé and V. Vionnet (2016), Elevation Changes Inferred From TanDEM-X Data Over the Mont-Blanc Area: Impact of the X-Band Interferometric Bias, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, *9*(8), 3870–3882, doi: 10.1109/JSTARS.2016.2581482.

R. Millan, A. Dehecq, E. Trouvé, N. Gourmelen and E. Berthier (2015), Elevation changes and X-band ice and snow penetration inferred from TanDEM-X data of the Mont-Blanc area, *Analysis of Multitemporal Remote Sensing Images, 8th International Workshop in Annecy, 2015*, 1–4. doi: 10.1109/Multi-Temp.2015.7245753, (*Conference paper*)

Oral Presentations

R. Millan, E. Rignot, J. Mouginot, M. Wood, A Bjørk, M. Morlighem, Retreat of Southeast Greenland glaciers explained by NASA's Operation Icebridge and Ocean Melting Greenland data, *NASA's PARCA meeting, January 2018, Washington DC, USA*.

R. Millan, E. Rignot, M. H. Wood, J. Mouginot, A. A. Bjørk, M. Morlighem, Vulnerability of SouthEast Greenland glaciers to Atlantic warm water using Operation Icebridge and Ocean Melting Greenland data, *American Geophysical Union, Fall Meeting 2017, New Orleans, USA*.

R. Millan, E. Rignot, J. Mouginot, M. Morlighem, B. Scheuchl, Observation des glaciers et calottes polaires à partir de données satellitaires et aéroportées, *Invited Seminar at University of Grenoble, March 2017, Grenoble, France*.

R. Millan, E. Rignot, J. Mouginot, Remote Sensing of glaciers and ice caps in the Canadian Arctic (March 2017), *Invited Seminar at University of Copenhagen, March 2017, Copenhagen, Denmark*.

R. Millan, E. Rignot, J. Mouginot, D. Menemenlis, M. Morlighem and M. Wood, Retreat of Southeast Greenland glaciers from Operation Icebridge and Ocean Melting Greenland Data, *NASA's Ocean Melting Greenland 2017 Meeting, Irvine, USA*.

R. Millan, E. Rignot, J. Mouginot, D. Menemenlis, M. Morlighem and M. Wood, Bathymetry of Southeast Greenland glaciers from Operation Icebridge and Ocean Melting Greenland Data, *NASA's Operation Icebridge 2017 Meeting, Irvine, USA*.

R. Millan, J. Mouginot, E. Rignot, Mass budget of the glaciers and ice caps of the Queen Elizabeth Islands, Canada, from 1991 to 2015, *American Geophysical Union, Fall Meeting 2015, San Francisco, USA*.

Posters

R. Millan, E. Rignot, J. Mouginot, D. Menemenlis, M. Morlighem and M. Wood, Bathymetry of Southeast Greenland glaciers from Operation Icebridge and Ocean Melting Greenland Data, *NASA's PARCA meeting, January 2018, Washington DC, USA*.

R. Millan, E. Rignot, J. Mouginot, D. Menemenlis, M. Morlighem and M. Wood, Understanding changes in ice dynamics of southeast Greenland glaciers from high resolution gravimetry data and satellite remote sensing observations,*American Geophysical Union, Fall Meeting 2016, San Francisco, USA*.

Public Outreach

- **CBCnews (interview and online article)** — Canada
  As Arctic warms, Canada's glaciers playing major role in sea level rise — *Feb. 20 2017*
- **Globalnews (interview, video documentary and online article)** — Canada
  As Arctic warms, Canada's glaciers playing major role in sea level rise — *Feb. 15 2017*
- **Vice - Motherboard (interview and online article)** — International
  Canada's Melting Glaciers are Causing Sea Level Rise Around the World — *Feb.14 2017*
- **ScienceDaily (online article)** — International
  Seafloor valleyrs discovered below West Antarctic glaciers — *Jan. 18 2017*
- **International Business Times (online article)** — USA
  Gigantic valleys revealed beneath West Antarctic Ice Sheet — *Jan. 20 2017*

Activities

- **Sports**
  - Mountain sports : climbing, hiking, mountain biking, slacklining
  - Swimming
- **Music**
  - Trumpet player (17 years) in jazz band and classical orchestra

References

- **Eric Rignot** - University of California, Irvine and NASA's Jet Propulsion Laboratory, USA
- **Jeremie Mouginot** - Institut des Géociences de l'Environnement, Grenoble, France
- **Abbas Shfaqat Khan** - DTU/SPACE, Copenhagen, Denmark
- **Noel Gourmelen** - University of Edinburgh, United Kingdom