

Anastasia G. Yanchilina

314-312-9284 ◇ ayanchilina@seti.org

EDUCATION

Columbia University Earth and Environmental Sciences, Ph.D.	May 2016
Columbia University Earth and Environmental Sciences, M.Phil.	May 2014
Columbia University Earth and Environmental Sciences, M.A.	May 2012
Creighton University Atmospheric Science, B.S., Physics and Mathematics minors	May 2009

RESEARCH EXPERIENCE

Frank Drake Postdoctoral Fellow <i>SETI Institute</i> <i>Advisor: Nathalie Cabrol</i> Generation of abiotic minerals / chemical garden biomorphs specific to looking for potential biosignatures on Ocean Worlds.	Dec. 2024 - Present
Postdoctoral Scholar Research Associate in Geochemistry <i>Division of Geological and Planetary Sciences, California Institute of Technology</i> <i>Advisors: Amy E. Hofmann and John Eiler</i> Vapor pressure isotope effects (VPIE's) relevant to planetary atmospheres and surface liquids.	Dec. 2023 - Nov. 2024
Research scientist <i>Impossible Sensing, LLC.</i> <i>Industry advisor: Pablo Sobron</i> <i>SHERLOC advisors: Luther Beegle, Kevin Hand, and Kyle Uckert</i> Supporting Mars 2020 / Perseverance and Scanning for Habitable Environments with Raman and Luminescence for Organics and Chemicals (SHERLOC) science operations with focuses on imaging, UV Raman and fluorescence data analysis together with developing spectroscopy technologies for deep ocean and space exploration.	Jan. 2021 - Oct. 2023
Visiting scientist <i>Impossible Sensing, LLC.</i> <i>Advisor: Pablo Sobron</i> Preparing underwater laser Raman and fluorescence technology for deployment towards exploration of hydrothermal vents / In-Situ Vent Analysis Divebot for Exobiology Research (InVADER).	July 2020 - Dec. 2020

STEM Zuckerman Postdoctoral Fellow Oct. 2016 - July 2020

Advisors: Aldo Shemesh and Yehoshua Kolodny

Department of Earth and Planetary Science, Weizmann Institute of Science

Using silica $\delta^{18}\text{O}$ to understand formations of biogenic deep-sea cherts and reconstructing Cenozoic paleoenvironments.

Postdoctoral Scholar April 2016 - Sept. 2016

Lamont Doherty Earth Observatory, Columbia University

Advisors: Bill Ryan and Jerry McManus

Reconstructing paleoenvironments in the Black and Marmara Sea's over the past hundred thousand years.

Staff Associate Jan. 2016 - March 2016

Lamont Doherty Earth Observatory, Columbia University

Advisors: Bill Ryan and Jerry McManus

U/Th dating of mollusks in the Black Sea and reconstructing paleoenvironments in the Black and Marmara Sea's over the past hundred thousand years.

Graduate Student Research Fellow Sept. 2009 - Dec. 2015

Lamont Doherty Earth Observatory, Columbia University

Advisors: Bill Ryan and Jerry McManus

Deglaciation of the Black and Marmara Seas.

SOARS protégée May 2009 - Aug. 2009

Atmospheric Chemistry Division (ACD), National Center for Atmospheric Research (NCAR)

Advisor: Daniel Marsh

Upper atmospheric photochemistry / 27-day solar cycle impacts and climate.

Research Experience for Undergraduates (REU) fellow May 2008 - Aug. 2008

Geology and Geophysics Department, Woods Hole Oceanographic Institution (WHOI)

Advisors: Jerry McManus, Tim Eglington, and Daniel Montlucon

Using TEX_{86} and alkenones for paleotemperature reconstructions from drilled sediments at Bermuda Rise

SOARS protégée May 2007 - Aug. 2007

Atmospheric Chemistry Division (ACD), National Center for Atmospheric Research (NCAR)

Advisor: Lee Mauldin

Adapting Selective Ion Chemical Ionization Mass Spectrometer (SICIMS) for a flight campaign on C-130 to study natural marine sulfur cycle in the open tropical pacific, specific for Pacific Atmospheric Sulfur Experiment (PASE).

Research Experience for Undergraduates (REU) fellow May 2006 - Aug. 2006

International Arctic Research Center (IARC), University of Alaska, Fairbanks

Advisor: Nicole Molders

Assessing statistical error in regional snow pack models for weather forecasting

Undergraduate Research Experience

April 2006 - May 2009

Department of Atmospheric Science, Creighton University

Advisor: Jon Schrage

Understanding changes Western African Monsoon (WAM) variability over the past hundred years and future fifty-year and hundred-year projections

PUBLICATIONS

1. Schmidt, M. et al. (*co-authored*), **in review**: Diverse and highly differentiated lava suite in Jezero crater, Mars: Constraints on intra-crustal magmatism revealed by Mars 2020 PIXL, *Science Advances*.
2. Yanchilina, A.G., Yam, R. and A. Shemesh, **2024**: Biogenic opal $\delta^{18}\text{O}$ in marine Sediments through the Cenozoic Era and implications for ocean cooling, *Chemical Geology*, 122293.
3. Yanchilina, A.G., L. Rodriguez, L. Barge, R. Price, and P. Sobron, **2024**: Mission to explore deep sea environments on Earth and other Ocean Worlds, *EOS Transactions*, Features column.
4. Scheller, E. et al. (*co-authored*), **2024**: Inorganic interpretation of luminescent materials encountered by the Perseverance rover on Mars, *Science Advances*, 10(39)
5. Phua, Y. Y., et al. (*co-authored*), **2024**: Characterizing Hydration Carrier Phases in Altered Rocks of Jezero Crater Fan and Floor Geologic Units with SHERLOC on Mars 2020, *JGR:Planets*.
6. Benison, K. et al. (*co-authored*), **2024**: Depositional and diagenetic sulfates of Hogwallow Flats and Yori Pass, Jezero crater: Evaluating preservation potential of environmental indicators and possible biosignatures from past martian surface waters and groundwaters, *JGR – Planets*.
7. Siljestrom, S. et al. (*co-authored*), **2024**: Evidence of Sulfate-Rich Fluid Alteration in Jezero Crater Floor, Mars, *Nature*.
8. Sharma, S. et al. (*co-authored*), **2023**: Diverse organic-mineral associations in Jezero crater, Mars, *Nature*, pp. 1-9.
9. Garczynski, B. et al. (*co-authored*), **2023**: Rock coatings as Evidence for Late Surface Alteration on the Floor of Jezero Crater, Mars, *Authorea preprints (submitted to ESS Open Archive)*.
10. Corpolongo, A. et al., (*co-authored*), **2023**: SHERLOC Raman mineral class detections of the Mars 2020 Crater Floor Campaign, *Journal of Geophysical Research, Planets*, 128 (3), e20222JE007455.
11. Scheller, E. et al. (*co-authored*), **2022**: Aqueous alteration processes and implications for organic geochemistry in Jezero crater, Mars, *Science*, eabo5204.
12. Fries, M. et al. (*co-authored*), **2022**: The SHERLOC Calibration Target on the Mars 2020 Perseverance Rover: Design, Operations, Outreach, and Future Human Exploration Functions, *Space Science Reviews*, 218, pp. 1-33.
13. Farley, K. et al. (*co-authored*), **2022**: Aqueously altered igneous rocks sampled on the floor of Jezero Crater, Mars, *Science*, 377, eabo2196.
14. Ibarra D. E., A. Yanchilina, M. K. Lloyd, K. A. Methner, C. P. Chamberlain, R. Yam, A. Shemesh, D. A. Stolper, **2021**: Triple oxygen systematics of diagenetic recrystallization of diatom opal-A to opal-CT to microquartz in deep sea sediments, *Geochimica et Cosmochimica Acta*, 320, pp. 304- 323.
15. Yanchilina, A.G., R. Yam, A. Shemesh, **2021**: The effect of sediment lithology on oxygen

isotope composition and phase transformation of marine biogenic silica, *Chemical Geology*, 570.

16. Yanchilina, A.G., R. Yam, Y. Kolodny, A. Shemesh, **2020**: From diatom opal-A $\delta^{18}\text{O}$ to chert $\delta^{18}\text{O}$ in deep sea sediments, *Geochimica et Cosmochimica Acta*, 268, pp. 368-382.
17. Yanchilina, A.G., W.B.F. Ryan, T.C. Kenna, and J.F. McManus, **2019**: Meltwater floods into the Black and Caspian Seas during Heinrich Stadial 1, *Earth Science Reviews*, 198.
18. Briceag, A., A. Yanchilina, W.B.F. Ryan, M. Stoica, M. C. Melinte-Dobrinescu, **2019**: Late Pleistocene to Holocene paleoenvironmental changes in the NW Black Sea, *J. Quaternary Science*, 32, pp. 87-100.
19. Yanchilina, A.G., S. Yelisetti, M. Wolfson-Schwer, N. Voss, T. B. Kelly, J. Brizzolara, K. L. Brown, J.M. Zayak, M. Fung, M. Guerra, B. Coakley, R. Pockalny, **2017**: Exploring Methane Gas Seepage in the California Borderlands, *EOS Transactions*, Project Update Column.
20. Yanchilina, A.G., et al., **2017**: Compilation of geophysical, geochronological, and geochemical evidence indicates a rapid Mediterranean-derived submergence of the Black Sea's shelf and subsequent salinification in the early Holocene, *Marine Geology*, 383, pp. 14-34.
21. Langebroek, P., C. Bradshaw, A. G. Yanchilina, R. Cabellero-Gill, C. Pew, K. Armour, S.-Y. Lee, I. – M. Jansson, **2012**: Improved proxy of past warm climates needed, *EOS Transactions*, 93, 14, pp. 144-145.

HONORS AND AWARDS

Frank Drake Postdoctoral Fellowship	Dec. 2024 - Present
STEM Zuckerman Postdoctoral Fellowship	Oct. 2016 – Dec. 2020
National Science Foundation Graduate Fellowship Honorable Mention	2010, 2011
American Meteorological Society Graduate Fellowship	Sept. 2009 - May 2010
Goldwater Scholarship	2008
Creighton University Presidential Scholarship	Sept. 2005 – May 2009

FIRST AUTHOR PRESENTATIONS

Isotope Diagenesis of biogenic silica in marine sediments and implications for paleotemperature reconstruction, *University of California Riverside Astrobiology Seminar Series* (Invited Talk, November 2024)

Isotope Diagenesis of biogenic silica in marine sediments and implications for paleotemperature reconstruction, California Institute of Technology Fall Geoclub Series (Talk, October 2024)

Search for Biosignatures Across Space and Time, *Cal Tech Astronomy on Tap* (Invited Talk, October 2024)

Characterization of silicate minerals in Alfalfa, Maaz Unit of Jezero Crater Floor, Mars,

Goldschmidt Science Conference (poster, July 2023)

Red Planet Rising: Organic and Other Matters, *Polyplexus Talk Polymath Series* (Invited Talk, Sep. 2022)

New laser-based Platform for Real-time Discovery and Mapping of Critical Minerals, *American Geophysical Union Fall Meeting* (poster, Dec. 2021)

Applications of Surface-Enhanced Raman Spectroscopy (SERS) for improved detection of astrobiologically relevant organics, *American Geophysical Union Fall Meeting* (poster, Dec. 2021)

DiSCO (Dual In-Situ Spectroscopy and Coring), *52nd Lunar and Planetary Science Conference* (poster, March 2021)

Effect of sediment lithology upon maturation pathways of marine biogenic amorphous opal to opal-CT and microquartz chert, *American Geophysical Union Fall Meeting* (poster, Dec. 2019)

Marine $\delta^{18}\text{O}$ through the Cenozoic: evidence from biogenic opal, *American Geophysical Union Fall Meeting* (poster, Dec. 2019)

The Change in Black Sea Water Composition and Hydrology during Deglaciation from Multiproxy Reconstructions, *American Geophysical Union Fall Meeting* (poster, Dec. 2014)

Elevated biological productivity as a trigger for the Holocene sapropel in the Black Sea during its reconnection with the Mediterranean Sea, *American Geophysical Union Fall Meeting* (talk, Dec. 2013).

Determining the Nature of the Last Major Black Sea Transgression: Fresh or Marine? *American Geophysical Union Fall Meeting* (poster, Dec. 2012).

Model analysis of 27-day solar-induced variability of chemical dynamics in the equatorial upper and middle atmosphere, *European General Assembly* (poster, May 2010).

Multiproxy Comparison of Climatic and Oceanographic Conditions in the Subtropical North Atlantic during the last 20,000 years, *American Geophysical Union Spring Meeting* (poster, April 2009)

Atmospheric Measurements aboard C-130 during the Pacific Atmospheric Sulfur Experiment, *American Geophysical Union* (poster, Dec. 2007)

INTERNATIONAL FIELD EXPERIENCE

Chief Scientist Training Cruise, Honolulu to San Diego

Dec. 2016

Black Sea Research Expedition, Black Sea

June – July, 2011

Pacific Atmospheric Sulfur Experiment, Christmas Island (Kirimati)

Aug. – Sept. 2007

FILM EXPERIENCE

Lost Cities with Albert Lin, National Geographic

Oct. 2020

TEACHING

Teaching Assistant

Jan. 2010 – Dec. 2015

Department of Earth Sciences, Columbia University

Helped as a teaching assistant to undergraduate and graduate classes that included quantitative methods of data analysis (QMDA), Weapons of Mass Destruction, Oceanography, and Planet Earth.

MENTORSHIP

Lumiere Program

Fall 2024

- Yida Du, *Beijing Chaoyang Kaiwen Academy (high school student)*

California Institute of Technology

Nov. 2023 – Nov. 2024

- Sarah Lamm, *Ph. D. candidate at University of Kansas, Kansas City*

Impossible Sensing, LLC.

- Zachary Bernard, *Ph.D. Candidate at Washington University in St. Louis* Spring 2023
- Luke Seaton, *Ph.D. Candidate at Michigan State University* Summer 2022

Weizmann Institute of Science

- Wu Li, *Ph.D., Tonji University in Shanghai* Spring 2020

Columbia University

- Andrei Briceag Summer 2013
- Burcu Barin Karacanta, Summer 2012
General Directorate of Mineral Research and Exploration | MTA
- Elizabeth Matamoros Summer 2012
Senior Advisor, Capital Project Management at NYC Mayor's Office

OUTREACH

New York Academy of Science Mentor

Spring 2017

Mentored a student matched through this program specific to encouraging and serving as a liason for women in science from SUNY.

New York Academy of Science Mentor

Spring 2016

Worked with students from a local high school in the Bronx specific to Oyster Restoration and Ecology afterschool mentorship program. Lead and organized field trips and experiments to teach students about the importance of oysters to estuarine health of New York bay areas.

New York Academy of Science Teaching Fellow

Fall 201

Worked with a local k-12 school students where developed a lesson plan specific to earth science where the students did a series of learning exercises and experiments.