
RESEARCH & TEACHING INTERESTS

Broadly-trained geochemist with expertise in biogeochemical cycles, interested in large-scale carbon cycle dynamics and planetary habitability. Technical skills include: trace element concentration measurements, stable- and radio-isotope measurements, thermodynamic and kinetic modelling, and the development of new stable isotope systems. Author of 4 peer-reviewed publications. Ability to teach on a wide range of courses in biogeochemistry, Earth-surface processes and sedimentology.

EDUCATION

- University of Cambridge**, Cambridge, UK Oct 2020 – Present
PhD
The Impact of Adsorption-Desorption Reactions on Chemical Weathering and the Carbon Cycle
Supervisor: Dr. Edward Tipper
- University of Cambridge**, Cambridge, UK Oct 2019 – Jun 2020
M.A.St. Earth Sciences
Degree Classification: Distinction (76%)
(1/5)
- University of Bristol**, Bristol, UK Sep 2016 – Jun 2019
B.Sc. Geology
Degree Classification: 1st Class (76%)
(N/A)

PUBLICATIONS

PUBLISHED

- **Alasdair C.G. Knight**, Luke Bridgestock, Harold J. Bradbury, Alexandra (Sasha) V. Turchyn, Edward T. Tipper. *Experimental Constraints on Barium Isotope Fractionation during Adsorption-Desorption Reactions and Implications for Environmental Tracer Applications*. *Geochimica et Cosmochimica Acta*.
- **Alasdair C.G. Knight**, Emily I. Stevenson, Luke Bridgestock, J. Jotautas Baronas, William J. Knapp, Basanta Raj Adhikari, Christoff Andermann, Edward T. Tipper. 2024. *The Impact of Adsorption-Desorption Reactions on the Chemistry of Himalayan Rivers and the Quantification of Silicate Weathering Rates*. EPSL.
- William J. Knapp, Emily I. Stevenson, Phil Renforth, Philippa L. Ascough, **Alasdair C. G. Knight**, Luke Bridgestock, Michael J. Bickle, Yongjie Lin, Alex L. Riley, William M. Mayes, Edward T. Tipper. 2023. *Quantifying CO₂ Removal at Enhanced Weathering Sites: a Multiproxy Approach*. *Environmental Science & Technology*.
- Edward T. Tipper, Emily I. Stevenson, Victoria Alcock, **Alasdair C. G. Knight**, J. Jotautas Baronas, Robert G. Hilton, Mike J. Bickle, Christina S. Larkin, Linshu Feng, Katy E. Relph, Genevieve Hughes. 2021. *Global Silicate Weathering Flux Overestimated because of Sediment-Water Cation Exchange*. *Proceedings of the National Academy of Sciences*, 118(1).

DATA PUBLICATIONS

- **Alasdair C.G. Knight**, Emily I. Stevenson, William J. Knapp, Edward T. Tipper. 2024. *Cation and suspended sediment concentrations from the Mackenzie River and Estuary, Canada, September 2022*. NERC EDS Environmental Information Data Centre.
- **Alasdair C.G. Knight**, Christoff Andermann, Ambika Sitaula, Basanta Adhikari, Edward T. Tipper. 2024. *PRESSurE River Chemistry Time Series (Nepal)*. GFZ Data Services.

PRESENTATIONS & POSTERS — presenting author only (‡Invited presentation)

- ‡**Alasdair C.G. Knight**, Luke Bridgestock, Alexandra (Sasha) V. Turchyn, Edward T. Tipper. 2024. *Tracing Metal Nutrient Stock Perturbations using Barium Isotopes: An Experimental Approach*. IPGP Invited Seminar.
- **Alasdair C.G. Knight**, Emily I. Stevenson, Edward T. Tipper. 2024. *Exploring the Global Dynamics of Riverine Adsorbed Cation Fluxes*. Geochemistry Group Research in Progress (GGRiP). Poster. *Awarded a best poster prize*.
- **Alasdair C.G. Knight**, Luke Bridgestock, Alexandra (Sasha) V. Turchyn, Edward T. Tipper. 2023. *Experimental Constraints on Barium Isotope Fractionation during Adsorption-Desorption Reactions: Implications for Critical*

Zone Tracer Applications. Goldschmidt Conference. Presentation.

- **Alasdair C. G. Knight**, Emily I. Stevenson, Luke Bridgestock, Christoff Andermann, Edward T. Tipper. 2022. *Chemical Weathering Fluxes Underestimated in Erosion Hot-Spots due to the Hidden Riverine Flux of Adsorbed Cations*. Goldschmidt Conference. Presentation.
- **Alasdair C.G. Knight**, Emily I. Stevenson, Luke Bridgestock, Christoff Andermann, Edward T. Tipper. 2022. *Chemical Weathering Fluxes Underestimated in Erosion Hot-Spots due to the Hidden Riverine Flux of Adsorbed Cations*. Geochemistry Group Research in Progress (GGRiP). Presentation.

FIELDWORK EXPERIENCE

Nepal

Sep 2024 & Oct 2022

Melamchi Valley, Himalayas

- Preparation for a 14-day-long fieldwork campaign to Nepal.
- Sampling of rainwater and springs to understand the link between meteoric fluid percolation through the weathering zone and weathering reactions in a rapidly eroding Himalayan catchment.

Canada

Sep 2022

Mackenzie River and Mackenzie Estuary

- Planning, preparation and successful execution of a two-week-long fieldwork campaign to the Mackenzie River (Inuvik) and Mackenzie Estuary (Tuktoyaktuk) with five colleagues.
- Sampling of water and sediment from boats along a salinity transect to quantify adsorption-desorption reactions at the freshwater-saltwater interface.
- Geochemical fieldwork tasks performed: Gran titrations, collection and filtration of water samples using a depth-sampler and filtration units, acidification of cation and isotope samples, collection of dissolved inorganic carbon samples (DIC), salinity depth-profiles, acoustic doppler current profiler (ADCP) transects, storage and mapping of sample locations and meta-data.

LABORATORY EXPERIENCE

Cambridge

Oct 2019 - Present

Department of Earth Sciences Clean Laboratories

- Ability to run chromatography columns for the following isotope systems: stable barium, stable strontium, stable lithium, radiogenic strontium.
- Development of a new ion-exchange column elution chromatography procedure (stable rubidium).
- Independent operation of a range of instruments: ICP-OES [Agilent 5100], ICP-MS [iCAP-RQ Plus], MC-TIMS (Triton-Plus) and MC-ICP-MS (Neptune).
- Extensive experience planning and performing controlled laboratory batch experiments between minerals and surface waters.
- Confident using a wide range of standard laboratory equipment within a clean-laboratory setting (centrifuge, ultrasonic bath, shaker table, bench-top and mobile pH meters, titration of acids, calibration and weighing on a high-precision mass balance, producing concentration calibration standards, usage and cleaning practises for polytetrafluoroethylene (PTFE), polypropylene (PP), polyvinyl chloride (PVC)).

TEACHING & SUPERVISION EXPERIENCE

NERC DTP Intern Supervisor

University of Cambridge

Jun 2022 - Aug 2022

- Supervision of an 8-week-long NERC summer student.
- Key tasks involved: project planning, clean laboratory teaching and supervision, help with coding in R.

Undergraduate Supervisor

University of Cambridge

Oct 2021 - Present

- Providing supervisions to undergraduate students at all levels (years 1-4) on the Cambridge Earth Sciences course.

Undergraduate Demonstrator

University of Cambridge

Oct 2020 - Present

- Demonstrating undergraduate practical classes at all levels (years 1-4) on the Cambridge Earth Sciences course.

PROFESSIONAL EXPERIENCE

UKRI Policy Internship

Government Scientist - DEFRA

London, UK

May 2023 - August 2023

- Modelling the supply, demand and leakage of high greenhouse warming potential (GWP) gases in the UK between 1990 and 2050, as part of the UK net-zero plan.
- Development of a quantitative linear optimisation model in R to identify the best pathway for GWP gas leak reductions.

Barclays Plc*Operations Analyst*

Glasgow, UK

Jun 2018 - Aug 2018

- Completion of a failure-mode effects analysis (FMEA) to examine risks to the internal systems of the investment bank.
- Graded outstanding in the end-of-internship review.

University of Bristol*Research Intern*

Bristol, UK

Aug 2017

- Mapping and quantification of void volume in corals collected from the Chagos Archipelago using a micro CT scanner and Avizo 3D software.
- Modelling changes in bio-eroder species and bio-erosion rates as a proxy for warming events in the geological record.

Clarksons Platou*Data Analyst*

Ledbury, UK

Aug 2015

- Producing an updated database on the maritime industry for research.

RELEVANT SKILLS

- **Programming:** Python, Matlab, R, Julia.
- **Software:** Latex, QGIS, Inkscape.

NON-ACADEMIC ROLES

Treasurer*University of Cambridge Athletic Club (CUAC)*

May 2023 - Present

- Stewardship of CUAC finances to ensure the long-term success of the club.
- Introduction of a termly payment method with bursary reductions to increase accessibility.