

ALEXANDRA E. PYE

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New Mexico Geochronology Research Laboratory

New Mexico Bureau of Geology and Mineral Resources, New Mexico Institute of Mining and Technology

PROFESSIONAL EXPERIENCE

Geochronologist

April 2024 - Present

New Mexico Geochronology Research Laboratory, New Mexico Bureau of Geology and Mineral Resources, New Mexico Institute of Mining and Technology.

Postdoctoral Research Scholar

December 2022 - March 2024

Group 18 Laboratories at the School of Earth and Space Exploration, Arizona State University

EDUCATION

Arizona State University

August 2016 - December 2022

Geological Sciences PhD

University of St Andrews

2012 - 2016

BSc (Hons) Geology

Classification: 2:1

PUBLICATIONS

Pye, A. E., Hodges, K. V., Ehlers, T. A., van Soest, M. C., McDonald, C. S., and Bhandari, B. (2024). Constraining the Exhumation History of the Greater Himalayan Sequence, Kali Gandaki, central Nepal. *Journal of the Geological Society*, 181 (2), jgs2023100.

Pye, A. E., Hodges, K. V., Keller, C. B., Law, R. D., van Soest, M. C., Bhandari, B. and McDonald, C. S. (2022). Prolonged Slip on the South Tibetan Detachment Constrains Tectonic Models for Synorogenic Extension in the Central Himalaya. *Tectonics*, 41, e2022TC007298.

Pye, A. E., Hodges, K. V., Ehlers, T. A., van Soest, M. C., Leonard, J. S., Keller, C. B., Bhandari, B. and McDonald, C. S. (in prep*). Constraining the Deformation History of the South Tibetan Detachment system in the Marsyandi Valley, Central Nepal.

van Soest, M. C., Brunner, A. E., Hodges, K. V., Osinski, G. E., **Pye, A. E.** and Biren, M. (in prep*). Strategies for U/Pb Geochronology of Impact Crater Structures: Lessons from the West Clearwater Lake Crater, Canada.

Miller, H. B. D., **Pye, A. E.**, Brunner, A. E., Mercer, C. M., van Soest, M. C., McDonald, C. S., and Hodges, K. V. (in prep*) High-Spatial Resolution $^{40}\text{Ar}/^{39}\text{Ar}$ UV-Laser Ablation Geochronology of Apollo 15 Impact Melt Rock 15455.

*in prep refers to fully drafted manuscripts undergoing final edits with co-authors.

CONFERENCE ABSTRACTS

Hodges, K. V.*, Ehlers, T. A., Giblin, J. L., **Pye, A. E.**, Sparks, S. A., Whipple, K. X. (2023). The Added Value of Multichronometry to Exploring the Exhumation History of Orogenic Landscapes. *American Geophysical Union Fall Meeting*.

Pye, A. E.*, Brunner, A. E., McDonald, C. S., Hodges, K. V., Osinski, G. R., van Soest, M. C. (2023). Benefit of Using Both Laser Microprobe and Bulk Incremental Heating $^{40}\text{Ar}/^{39}\text{Ar}$ Techniques to Constrain the Timing of Impact Events: An Example from the West Clearwater Lake Impact Structure, Canada. *Geological Society of American Annual Meeting*.

Pye, A. E.*, Hodges, K. V., Ehlers, T. A., van Soest, M. C., McDonald, C. S. and Bhandari, B. (2023). Using One-Dimensional Thermal-Kinematic Modeling to Constrain the Evolution of the Greater Himalayan Sequence, Central Nepal. *Geochronology Gordon Research Conference and Gordon Research Seminar*.

Pye, A. E.*, Hodges, K. V., Ehlers, T. A., Keller, C. B., van Soest, M. C., McDonald, C. S. and Bhandari, B. (2022). The Exhumation History of the Greater Himalayan Sequence, central Nepal. *Geological Society of America Annual Meeting*.

Pye, A. E.*, Brunner, A. E., Hodges, K. V., McDonald, C. S., Osinski, G. R., van Soest, M. C. (2021). Establishing Best Practices for Dating Impact Structures Using the $^{40}\text{Ar}/^{39}\text{Ar}$ UVLAMP Technique: A Case Study from West Clearwater Lake. *American Geophysical Union Fall Meeting*.

Pye, A. E.*, Hodges, K. V., van Soest, M. C., McDonald, C., S. and Schultz, M. H. (2021). Empirically Testing the Helium Closure Temperature of Monazite, 17th International Conference on Thermochronology.

van Soest, M. C., Aigner, M.*, Hodges, K. V., **Pye, A. E.** (2021). Laser Ablation Depth Profiling of Helium in Accessory Minerals: Imaging Alpha Ejection Zones and Natural Helium Diffusional Loss Profiles, *17th International Conference on Thermochronology*.

Pye, A. E.*, Hodges, K. V., van Soest, M. C. and Bhandari, B. (2019). Constraints on the age of ductile extension along the basal South Tibetan Detachment, Annapurna Range, Central Nepal, *Geological Society of America Annual Meeting*.

*Presenting Author

INVITED TALKS

Pye, A. E., The Evolution of the South Tibetan Detachment System in Central Nepal. School of Earth and Space Exploration Colloquium, Arizona State University, 27 September 2023.

Pye, A. E., The Application of Geochronology and Thermochronology to Tectonics and Planetary Science. New Mexico Bureau of Geology and Mineral Resources, New Mexico Tech, 7 June 2023.

ANALYTICAL EXPERIENCE

Noble Gas Mass Spectrometry Thermo Scientific *Argus VI*, Thermo Scientific *HELIX MC*, IsotopX *NGX*, Nu Instrument *Noblesse*, ASI *Alphachron*. Experience with both bulk and in situ techniques.

Laser Ablation Inductively Coupled Plasma Mass Spectrometry. Thermo Scientific *iCAP Q* (both solution mode and in situ).

Sample Characterisation

Horiba Scientific *XplorRA PLUS confocal* Raman microscope, JEOL *JXA-8530F* electron microprobe, ADE *PhaseShift MicroXAM* interferometric microscope to measure volumes of ablated pits.

Mineral Separation

Standard mineral separation procedures for monazite, zircon, apatite, titanite, K-feldspar, muscovite, biotite and tourmaline.

RESEARCH EXPERIENCE

Postdoctoral Research Scholar

December 2022 - March 2024

Group 18 Laboratories at School of Earth and Space Exploration.

Project: High spatial resolution $^{40}\text{Ar}/^{39}\text{Ar}$ chronometry of impact melts in lunar meteorites to better constrain the impact history of the Moon

PhD Student*August 2016- November 2022*

Advisor: Kip Hodges. Group 18 Laboratories at School of Earth and Space Exploration.

Dissertation Title: "The Evolution of Infrastructure-Superstructure Interactions in the Annapurna region, central Himalaya."

Undergraduate Student*March 2015 - March 2016*

Advisor: William McCarthy. University of St Andrews.

Dissertation Title: "The Metamorphic Evolution of the Dalradian Country Rocks that Surround the Omev Granite, Connemara, Ireland."

TEACHING EXPERIENCE

SES464 Solving Environmental Problems*Spring 2020*

Arizona State University - TA

SES494 Exploring Data with Python, SES598 Python for Graduate Research*Spring 2019*

Arizona State University - TA

GLG103 Introduction to Geology 1 Labs*Spring 2017*

Arizona State University - TA

GLG103 Introduction to Geology 1 Labs*Fall 2016*

Arizona State University - TA

AWARDS

Gordon Research Seminar on Geochronology Travel Support*2023*

Travel support \$920.

SESE Summer Exploration Graduate Research Award*2021*

Research Funds granted \$1000.

Geohost Award*2020*

Fully paid travel, conference registration and accommodation for the 36th International Geology Conference in Delhi. Conference postponed due to Covid-19.

SESE Safety Award*2020*

School of Earth and Space Sciences, Arizona State University

For demonstrating noteworthy safety practices, resulting in a safer work environment for the month of January.

Outstanding Graduate Teaching Assistant for a Laboratory Course*2019*

School of Earth and Space Sciences, Arizona State University

Exemplary service and dedication during the 2018-2019 academic year.

Geological Society of America Graduate Student Research Grant*2018*

Research Funds granted \$1900.

FIELDWORK EXPERIENCE

Annapurna Region, Nepal*March 2020*

Arizona State University

3 Weeks

Fieldwork studying the South Tibetan Detachment System in the Myagdi Khola Valley. Characterised deformation at the outcrop scale. Sample collection at the outcrop scale and along a transect from beneath the STDS across the Main Central Thrust. Fieldwork was cut short due to Covid-19.

Annapurna Region, Nepal*October-November 2018*

Arizona State University

4 Weeks

Fieldwork studying different strands of the South Tibetan Detachment System in the Kali Gandaki and

Marsyandi Valleys. Characterised deformation at the outcrop scale, as well as structural relationships between deformation fabrics and leucogranite intrusions. Sample collection at the outcrop scale and also along transects to collect samples for exhumation rate studies.

Connemara, Ireland

June 2015

University of St Andrews

4 Weeks

Dissertation fieldwork. Mapping a 5 km² area containing a granitic pluton and metamorphic country rocks, looking at different mineral assemblages and metamorphic grade. The country rocks had undergone regional metamorphism, and were overprinted by contact metamorphism due to the emplacement of the granite. Lab work carried out included petrographic analysis of thin sections and electron microprobe work.

Other

2012-2016

Various 1 day - 2 week mapping/field trips in Scotland, Spain and the Alps (roughly 9 weeks total).

OTHER SKILLS

Coding Experience

Python, Matlab

Data Reduction Software Experience

Iolite, MassSpec, Pychron

Modelling Software Experience

QTQt, Pecube-D

Geospatial Software Experience

ArcGIS

I hold both British and American Driving Licences.

OTHER

Reviewer

American Chemical Society Petroleum Research Fund, Journal of Petrology, GChron.

Conferences

Discussion Leader Geochronology Gordon Research Seminar 2023 - Generation and Recycling of Earths Crust.

Outreach

Junior Science and Humanities Symposium, Scottsdale Preparatory Academy visiting speaker 8th grade Earth Science classes, Letters to a PreScientist, Night of the Open Door (ASU), SESE Open House (ASU), Earth and Space Exploration Day (ASU), Phoenix Comicon.

DEI

URGE SESE Pod (ASU), WISP (ASU).