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EDUCATION

2018 **PhD, Geological Sciences**, *University of Washington,* Seattle, WA
Department of Earth and Space Sciences; Thesis advisor: Alan R. Gillespie.
Dissertation: "*Quaternary glaciation in Central Asia*"

2003 **MSc, Geology,** *Mongolian University of Science and Technology*
School of Geology, Ulaanbaatar, Mongolia; Thesis advisor: Naidangiin Batsukh.
Dissertation: "*Formation features of geological environment of Darkhan city, Mongolia"*

2002 **BSc, Geology,** *Mongolian University of Science and Technology*
School of Geology, Ulaanbaatar, Mongolia

PROFESSIONAL EXPRIENCE

2018–present **Postdoctoral Research Associate**, *University of Washington*.
Supervisors: Alan Gillespie and Ron Sletten
Develop algorithm to detect ice/water phase transitions in the ground using MODIS data; develop a proposal to determine erosion of peneplains.

2008–2018 **Research / Teaching Associate,** *University of Washington.*
Research activities: field mapping and sample collection; physical and chemical processing of samples for cosmic-ray exposure dating; sample processing and analyses for optically-stimulated luminescence dating; spectral analyses and photo interpretation of satellite-measured data; numerical modeling of glacier energy and mass balance.
Teaching activities: taught and developed laboratory exercises and led field trips for undergraduate courses on physical geology, geomorphology, remote sensing, and GIS.

2012 August **Guest Researcher,** *Australian Nuclear Science and Technology Organization.*
*Supervisor: David Fink (*ANSTO, Australia)
Completed the chemical processing and transfer of BeO samples; helped and observed the measurements of the samples on the tandem accelerator ANTARES.

2012 February **Visiting Researcher,** *The Hebrew University of Jerusalem.*
Supervisor: Ari Matmon (HUJI, Institute of Earth Science, Israel)
Performed full chemical processing of samples for ^{10}Be dating.

2008 February **Visiting Scholar,** *University of Washington.*
Supervisor: Alan Gillespie (Dept. of ESS) & James Feathers (Dept. of Anthro.)
Chemical processing of samples for luminescence dating (OSL); measuring and analyzing single-grain OSL data; counted craters of Mars using MOLA and THEMIS data.

2003–2008 **Lecturer,** *Mongolian University of Science and Technology,* School of Geology.
Lectured and taught laboratory exercises for undergraduate courses on hydrogeology and engineering geology. Led mapping field trips.

PUBLICATIONS

Published (peer-reviewed):

Batbaatar, J., Gillespie, A.R., Fink, D., Matmon, A., Fujioka, T., 2018. Asynchronous glaciations in arid continental climate. *Quaternary Science Reviews*, v. 182, p. 1–19. https://doi.org/10.1016/j.quascirev.2017.12.001

Herget, J., Carling, P., Agatova, A., **Batbaatar, J.**, Borodavko, P., Gillespie, A., Nepop, R., 2017. Comment on Gribenski, N. et al., 2016. Complex patterns of glacier advances during the late glacial in the Chagan Uzun Valley, Russian Altai. Quaternary Science Reviews 149, 288–305. *Quaternary Science Reviews*, v. 168, p. 216–219. https://dx.doi.org/10.1016/j.quascirev.2017.04.014

Batbaatar, J., and Gillespie, A.R., 2016. Outburst floods of the Maly Yenisei. Part I. *International Geology Review,* v. 58, no. 14, p. 1723–1752.

Batbaatar, J., and Gillespie, A.R., 2016. Outburst floods of the Maly Yenisei. Part II – new age constraints from Darhad basin. *International Geology Review*, v. 58, no. 14, p. 1753–1779.

Amit, R., Enzel, Y., Mushkin, A., Gillespie, A., **Batbaatar, J.**, Crouvi, O., Vandenberghe, J., An, Z., 2013. Linking coarse silt production in Asian sand deserts and the accretion of the Chinese Loess Plateau. *Geology,* v. 42, p. 23–26.

Smith, M. R., Gillespie, A.R., Montgomery, D.R., and **Batbaatar, J.**, 2009. Crater-fault dating: A new technique for dating fault zones on planetary surfaces. *Earth and Planetary Science Letters* 284, p. 151–156.

In preparation / In press:

Batbaatar, J., Gillespie, A.R., Koppes, M., Clark, D., Chadwick, O., Matmon, A., Fink, D., and Rupper, S., *in review.* Spatial pattern of glaciations across the climate-transect of Central Asia.

Gillespie, A.R., **Batbaatar, J.**, Liu, L., Mushkin, A., Sletten, R., O'Neal, M., *in preparation.* Mapping seasonal freeze-up and thaw on a regional scale.

Published (not peer-reviewed):

Batbaatar J., Gillespie, A.R., Feathers J.K., Fedotov A., and Bayasgalan A., 2008. The 92-m sediment core from Paleolake Darhad, Mongolia. *The 7th International Symposium on Environmental Changes in East Eurasia and Adjacent Areas-High resolution environmental records of terrestrial sediments, Ulaanbaatar-Hatgal, Mongolia, August 23-29.*

Batbaatar, J., and Gillespie, A.R., 2008. Glacial chronology on the southern margin of Siberia. *The XIV Glaciological Symposium on Glaciology from International Geophysical Year to International Polar Year, Glaciological Association, Institute of Geography RAS and Institute of Geography of Siberian Branch of RAS, Irkutsk, 3-11 September.*

Gillespie, A.R., **Batbaatar, J.**, and Mushkin, A., 2007. Report on the expedition to the Gov'i, July 2007. *Darcy Law and Modern Science Annual Scientific Congress, Mongolian University of Science and Technology, Ulaanbaatar, 10 November.*

Aley, M., **Batbaatar J.**, Jadambaa, N., Tserenjav, G., 2006. Regional Groundwater system of Mongolia. *Full papers of 34th Congress of International Hydrogeologists Association*.

Narantsetseg, Ts., Tomorkhuu, D., Dolgorsuren, H., Oyunchimeg, Ts., Baigal, O., Tuvshinjargal, H., Krivinogov, S., Kazanskyi, A., Matasova, G., Bezrukova, E., Gillespie, A., Bayasgalan, A., and **Batbaatar, J.**, 2006. Research of the sediments from paleolake in Darthad depression. *Institute of Minerals and Resources, Mongolian Academy of Sciences, Ulaan Baatar, Mongolia, 15 pp. (in Mongolian)*

Batbaatar, J., 2004. Formation features of geological environment of Darkhan city. *Mongolian Geoscientists, no.25, Abstract Issue on Geology and Geoecology of Mongolia, March 1, Darkhan-Uul aimag. (in Mongolian)*

Batbaatar, J., Munkh-Aldar, M., 2001. Contamination of the snow water in Ulaanbaatar city. *Geology Journal, School of Geology, MUST, Ulaanbaatar. (in Mongolian)*

CONFERENCE ABSTRACTS

Batbaatar, J., Gillespie, A.R., Fink, D., Matmon, A., Lai, Z.P., Koppes, M., 2017. Relative equilibrium-line altitude as an indicator of glacier sensitivity to temperature and precipitation. Geological Society of America Abstracts with Programs, Vol. 49, No. 6. doi: 10.1130/abs/2017AM-304129

Gillespie, A.R., **Batbaatar, J.**, Sletten, R.S., Trombotto, D., O'Neal, M., Hanson, B., Mushkin, A., Monitoring and mapping soil ice/water phase transitions in arid regions. Geological Society of America Abstracts with Programs, Vol. 49, No. 6. doi: 10.1130/abs/2017AM-303402

Gillespie, A., **Batbaatar, J.**, 2017. Satellite remote sensing of the water/ice phase transition in moist soil and permafrost. 48th ASTER Science Team Meeting, June 6, 2017, Tokyo, Japan.

Gillespie, A., **Batbaatar, J.**, Sletten, R., Trombotto, D., O'Neal, M., Hanson, B., Mushkin, A., 2017. Monitoring and mapping soil ice/water phase transitions: the role of ASTER thermal imaging. 48th ASTER Science Team Meeting, June 7, 2017, Tokyo, Japan.

Batbaatar, J., Gillespie, A., Turzewski, M., 2016. Dynamics of the paleofloods on the Maly Yenisei river. Fifth International Paleoflood Conference, September 12-15, Rapid City, SD, USA.

Wiedmer, M., Gillespie, A., Turzewski, M., Greenberg, H., **Batbaatar, J.**, 2016. Revisiting the Glacial Lake Atna megaflood, Alaska. Fifth International Paleoflood Conference, September 12-15, Rapid City, SD, USA.

Batbaatar, J., and Gillespie, A.R., 2015. Marine Oxygen Isotope Stage 3 glaciations in continental climate-regions of Central Asia. XIX INQUA Congress, 27 July – 2 August 2015, Nagoya, Japan.

Gillespie, A.R., and **Batbaatar, J.**, 2014. Climatic mediation of moisture sources on the southern edge of Siberia. Geological Society of America Abstracts with Programs, Vol. 46, No. 6, p. 798.

Gillespie, A.R., Ploskey, Z., **Batbaatar, J.**, 2014. Pleistocene ELA depression along the Pacific coast of North America. American Quaternary Association 23rd Biennial Meeting. Seattle, WA, August 8-10.

Batbaatar, J., and Gillespie, A.R., 2013. Spatial pattern of equilibrium-line altitude in Central Asia. Geological Society of America, Abstracts with Programs 45 (7), Paper No. 101-9.

Batbaatar, J., and Gillespie, A.R., 2013. Equilibrium-line altitudes of glaciers in hyper-arid regions of Central Asia. UW Earth and Space Sciences Research Gala. Seattle, April 4-5.

Batbaatar, J., and Gillespie, A.R., 2012. Equilibrium-line altitudes in cold hyperarid settings. American Geophysical Union, Fall Meeting. San Francisco, December 3-7 (abstract #C43E-06).

Batbaatar, J., Gillespie, A.R., Schreiber, B.C., 2012. Tectonics and Environment at the western end of the Baikal rift: Paleolake sediment record from Darhad Basin, northern Mongolia. GSA Cordilleran Seciotn: Geological Society of America Abstracts with Programs, Vol. 44, No. 3, p. 56.

Batbaatar, J., and Gillespie, A.R., 2010. ASTER reflectance and global DEM used to create map of glacial ELA depression in Central Asia. 37th ASTER Science Team Meeting, Tokyo, Japan.

Batbaatar, J., Feathers, J.K., and Gillespie A.R., 2009. IRSL feldspar dates for paleolake sediments from Darhad Basin, Mongolia. Geological Society of America Abstracts with Program, Vol. 41, No. 7, p. 382.

Gillespie, A.R., **Batbaatar, J.**, Feathers, J.K., 2008. First Direct Dating of MIS-2 Paleolake Sediments from Darhad Basin, Mongolia, GSA Joint Meeting, Geological Society of America Abstracts with Programs, Vol. 40, No. 6, p. 148.

Batbaatar, J., Gillespie, A.R., 2008. Glacial chronology on the southern margin of Siberia. The XIV Glaciological Symposium on Glaciology from International Geophysical Year to International Polar Year, Glaciological Association, Institute of Geography RAS and Institute of Geography of Siberian Branch of RAS, Irkutsk, 3-11 September.

Batbaatar, J., Batsukh, N., Aley, M., 2006. Possibility to build geothermal power plant in Shargaljuut, Mongolia. Proc. 7th Asian Geothermal Symposium.

TEACHING EXPERIENCE

2009–2018 Teaching Assistant at the University of Washington:

ESS 101: Intro to Geological Sciences; Autumn 2010, Winter 2013, Summer 2014, Spring, Autumn 2015, Autumn, Spring 2016, Winter 2017.

Hands-on lab exercises with 30 students per group, leading local field trips to introduce glacial, fluvial, volcanic deposits and basalt flows. Conducted student debates on environment and societal issues.

ESS 210: Physical Geology; Winter 2016.

Responsible for lab exercises on mineral identification, rock types, mapping techniques, and basic GIS tools (Google Earth, ArcGIS). Graded lab works and assisted in the field trip.

ESS 211: Physical processes of the Earth; Autumn 2017.

Responsible for lab exercises on analogue and numerical modeling of hillslope evolution, and basics of geological mapping techniques.

ESS 326: Geomorphology; Fall 2016.

Developed two new laboratory exercises. Led lab sections and co-led the field trips. Lab works included mapping techniques, GIS analysis, landslide assessment, and introductory numerical modeling.

ESS 421: Introduction to Geological Remote Sensing; Spring 2014.

Responsible for leading lab works to teach photo interpretation techniques (color mixing, shading), analysis of multispectral, radar, and elevation data, and application of spectroscopy. The lab exercises use ENVI, Google Earth, Excel. Advised and helped students to prepare proposal for projects of their own interests (student disciplines: geology, forestry, civil engineering, biology).

ESS 520: Application in GIS for the Earth Sciences; Winter 2016.

Assisted the students on computer-lab works involving GIS analysis using ArcMap and ENVI. Mentored students on conducting individual research projects as part of the class assignment and graded the merit and scientific writing of their final reports.

2003–2008 Lecturer at the Mongolian University of Science and Technology:

Intro to Hydrogeology (300-level class); Autumn semester every year.

Fully responsible for lectures and hands-on lab exercises to teach groundwater systems, hydraulic conductivity, Darcy's law, chemical composition of groundwater, water balance & recharge estimation.

Investigation Methods in Hydrogeology (400-level class); Spring semester.

Fully responsible for lectures and lab exercises to teach drilling and logging techniques, well design, monitoring, data analysis, water quality measurements, writing and reporting. I advised students preparing their bachelor's thesis proposals for graduation.

INVITED TALKS & SEMINARS

2014 **Humboldt State University,** Geology Colloquium: J. Batbaatar & Alan Gillespie, "Local LGM in the hyperarid Gobi of Mongolia". April, 2014.

2013 **University of Washington,** Department of Earth and Space Sciences, Brown Bag talk: Steve Warren & J. Batbaatar, "A trip through western Mongolia". April, 2013.

2012 **Australian Nuclear Science and Technology Organisation,** Institute for Environmental Research: "Using cosmogenic ^{10}Be to study the peculiar glaciers of Central Asia". August, 2012.

Hebrew University of Jerusalem, Institute of Earth Sciences: "Use of in-situ ^{10}Be for studying peculiar glaciers in Central Asia". February, 2012

2011 **Chinese Academy of Sciences**, Qinghai Institute of Salt Lakes: "Glaciers as climate recorders: How do we invert geological deposits into paleoclimate data?". September, 2011.

2008 **University of Washington,** Department of Earth and Space Sciences, Brown Bag talk: "Good to photograph while doing geology in Mongolia". December, 2008.

HONORS & AWARDS

2015 Competitive travel grants from International Union for Quaternary Research (INQUA) and College of the Environment, University of Washington

2014 Harry E. Wheeler Scholarship, UW

2013 Bourgeois Graduate Fund, rewarded for independent research proposal, UW
Vance Fellowship in Geology Sciences, UW

2012 Kenneth C. Robbins field study endowment, UW
Vance Fellowship in Geology Sciences, UW
Graduate School Fund for Excellence and Innovation, UW
Geological Society of America, Cordilleran Section Travel Grant

2011 Peter Misch Fellowship, UW
Department of Earth and Space Sciences Fellowship, UW
Graduate and Professional Student Senate Travel Grant, UW

2001 Best student award, Mongolian University of Science and Technology

FIELD & LAB PROJECTS

PhD thesis: Quaternary glaciation in Central Asia:
Established the chronology for glaciations in various climate regions of Central Asia and characterized the sensitivity of glaciers to climate. The field areas include the mountain ranges of East Sayan, Altai, Hangai, Gobi-Altai, Tian Shan, Altyn Tagh, Qilian Shan, and Kunlun.

2004–2016 Glacial and lake sediment records from Darhad basin, northern Mongolia:
The headwaters of the Yenisei river, Siberia, were repeatedly blocked by outlet glaciers during the Pleistocene. The breaching of the ice-dams generated catastrophic floods. We analyzed glacial and lacustrine sediments to determine the magnitude and the timing of the glacial advances and the paleolakes. We spent five field seasons for the project.

2009 Glacial chronology of Convict Creek, eastern Sierra Nevada, CA., USA:
I helped in the field work to sample glacial boulders the Convict Creek valley, California.

2008 Crater-fault interactions: Dating of fault zones on Martian terrain (Remote Sensing):
I counted faulted craters on Mars and categorized them based on their size and the relative age.

2004 Seismic hazard assessment of the Oyu Tolgoi mining, Ömnögovi Province, Mongolia:
I helped in the field work to identify potential active faults. We opened a few trenches to date paleo earthquakes. I identified the contacts and described the stratigraphy in the outcrop. In the lab, I helped to prepare the final report.

2003 Hydrogeological assessment for the Eg-Üür hydroelectricity plant, Hövsgöl Province, Mongolia:
I described the lithology and the grain size of the sediments extracted from the boreholes. I was also responsible for the hydrogeological monitoring in the wells and logging the data.

PROFESSIONAL SERVICES

Referee for Quaternary Research (since 2013), Annals of Glaciology (since 2015), Quaternary Science Reviews (since 2018), Journal of Quaternary Science (since 2018).

PROFESSIONAL AFFILIATIONS

2016–present The Quaternary Research Center, affiliate member

2014–present The American Quaternary Association, member

2012–present American Geophysical Union, member

2008–present Geological Society of America, member (QGG Section)