Dr. Steven B. Kidder

Department of Earth & Atmospheric Science, The City College of New York, Marshak Science Building
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EDUCATION

California Institute of Technology
Ph.D., Geology, 2012

Brown University
Visiting Graduate Student, 2009

University of Arizona
M.S., Geology, 2002

University of Minnesota
B.S., Geology, 1999

POSITIONS HELD

The City College of New York (CCNY)
Assistant Professor, 2014 – present

American Museum of Natural History
Research Associate, 2015 – present

Lamont Doherty Earth Observatory
Adjunct Associate Research Scientist, 2016 – present

University of Otago
NSF Postdoctoral Scholar, 2012 – 2014

California Institute of Technology
Postdoctoral Scholar, 2012

University of Arizona
Research Staff, 2003 – 2005

RESEARCH INTERESTS

Structural geology, lithospheric rheology, tectonics, microstructures, thermobarometry, diffusion, novel applications of inverse methods, and crustal evolution

AWARDS

NSF Earth Sciences Postdoctoral Fellowship
$170,000, 2011 (declined)

NSF International Research Postdoctoral Fellowship
$165,000, 2011

NSF Earth Sciences Graduate Fellowship
Honorable Mention, 2000

University of Minnesota:
Donath Honors & Richard Dennis Scholarships in Geosciences, 1998
Ruhnke Scholarship in Geological Engineering, 1997, 1998
Presidential Scholarship, 1994, 1995, 1996
Dean's List, 1995, 1996, 1997, 1998

FIELD WORK

I have worked in structurally complex sedimentary, metamorphic and igneous terrains in New Zealand, Taiwan, Central and Southern California, the Nepalese Himalaya, the Argentine Sierras Pampeanas, the Appalachians, and Colorado Plateau

TEACHING

College Courses

City College of New York:
Advanced Structural Geology (field mapping), 2017, 2019
Structural Geology, 2014, 2015, 2016, 2017, 2018, 2019, 2020
System Science of the Earth, 2014, 2015
Senior Project, 2018
Natural Hazards, 2016

Teaching Assistantships

California Institute of Technology:
Earth and Environment, 2010, Head TA
Tectonics and Crustal Structure of Southern California, 2008
Structural Geology, 2007

University of Arizona:
Igneous and Metamorphic Petrology, 2002
Structural Geology 2001, 1999
Oceanography, 2001

University Minnesota:
The Dynamic Earth, 1998, 1999

Guest Lecturer

Structural Geology
Caltech, 2010, 2011
University of Connecticut, 2009
University of Arizona, 2000

Field Trip Guide

Salinian Block, California
led field trips for Caltech, University of Southern California, Giessen University (Germany), and the Ventana Wilderness Society to the Salinian block, 2003 – 2004

INVITED TALKS

Johns Hopkins University, 2020 (postponed due to COVID-19)

Queens College (CUNY), 2019

Syracuse University, 2018

University of Colorado, Brown University, AGU Annual meeting, 2017

State University of New York New Paltz, Lamont-Doherty Earth Observatory, 2016

Princeton, Cambridge, City University of New York Graduate Center, 2015

American Museum of Natural History, Lamont-Doherty Earth Observatory, Queens College (CUNY), 2014

University of Texas Institute for Geophysics, UCLA, Brown University, Southern California Earthquake Center (SCEC) LAD workshop, University of Southern California (USC), Hastings Natural History Reservation, 2005 - 2010

GRANTS

NSF EAR - Tectonics, Cooling During Deformation: An Overlooked Scenario with Implications for the Analysis of Ductily Deformed Rocks, $382,22, 2020

NSF EAR - Tectonics, Decoding the Stress History of the Alpine Fault, $273,938, 2015

Block, K., Black, B., Kidder, S., Zhang, P., McDonald, K., 2018, CUNY Graduate Research Technology Initiative (GRTI), pXRF for Chemical Analysis of Materials, $38,000

SERVICE

AGU Session Primary Convener and Session Chair
"New insights on igneous and metamorphic processes from non-traditional thermobarometers and geospeedometers." Co-conveners: Matt Kohn, Will Nachlas, and Jay Thomas, 2016

City College New York
Div. of Sci. Masters Program Committee on Course and Standing (2015-present), Faculty Senate Physical Plant Committee, 2018-present

Department of Earth & Environmental Science, City College New York
Graduate advisor, 2014 – present; Developed a website for the graduate program, 2016; Executive Committee, 2019-present; Steering Committee for Graduate Studies (2015-present); Curriculum committee (2020-present); Founded and coordinate a weekly seminar, "Lunch Bunch," 2015 – 2018; Hiring committees (2014, 2015)

Tectonophysics Fridays
founded, organized and led a weekly graduate seminar at the University of Otago, 2012 – 2014

Science Outreach
presented work to the Otago Gem and Mineral Club, judged the Southern Arizona Regional Science and Engineering Fair, led geology hikes for middle school classes and partnered with a local science coordinator to develop classroom exercises in Pasadena, hosted elementary students and their parents at Caltech's *Science Saturday*, created a sandbox model and Youtube video about the Grand Canyon (13,000 views)

Pasadena Rheology Society
founded an informal discussion group of professors and students from Caltech, California State University Northridge, and University of Southern California, 2008 – 2012

Student-run symposiums and events
Zilchbrau (Caltech) co-chair, 2006; participant, 2007 – 2011
Geodaze (University of Arizona) committee member, 2002; co-chair, 2001

Monterey County Geologic Maps
produced and published online a series of geologic maps in collaboration with Hastings Natural History Reservation, 2003

Geology Club
University of Minnesota, Vice President, 1998 – 1999

PUBLICATIONS

"*" indicates CCNY student author

Kidder, S. B., Scott, J., Prior, Soleymani*, Shao, Y., *in review in Geology*, Localized Mantle Lithosphere Deformation during Alpine Fault Initiation, New Zealand

Soleymani*, H., **Kidder, S. B.**, *in review in hardwareX*, Upgrade to The Griggs Apparatus for Stress-controlled Testing of Geological Material at High Temperature and Pressure

Soleymani*, H., **Kidder, S. B.**, Hirth, G., 2020, The Effect of Cooling on Recrystallized Grain Size Piezometry, *Geology*, v.48, 6, p,531-535, doi: 10.1130/G46972.1

Chen, C., Chan, Y., Beyssac, O., Lu, C., Chen, Y., Malavieille, J., **Kidder, S. B.**, Sun, H., 2019, Thermal History of the Northern Taiwanese Slate Belt and Implications for Wedge Growth During the Neogene Arc-Continent Collision, *Tectonics*, v.38, no. 9, 3335-3350, 10.1029/2019TC005604

Kidder, S. B., Toy, V., Prior, D. J., Little, T., *Khan, A., MacRae, C., 2018, Constraints on Alpine Fault (New Zealand) mylonitization temperatures and geothermal gradient from Ti-in-quartz thermobarometry, *Solid Earth*, v. 9, p. 1123-1139, 10.5194/se-9-1123-2018

Cross, A. J., Prior, D. J., Stipp, M., **Kidder, S. B.**, 2017, The recrystallized grain size piezometer for quartz: An EBSD-based calibration, *Geophysical Research Letters*, 44, 13, p. 6667-6674 10.1002/2017GL073836

Nevitt, J. M., Pollard, D. D., Warren, J. M., **Kidder, S. B.**, 2016, Comparison of thermal modeling, microstructural analysis, and Ti-in-quartz thermobarometry to constrain the thermal history of a cooling pluton during deformation in the Mount Abbot Quadrangle, CA, *Geochemistry, Geophysics, Geosystems*, v. 18, 3, p. 1270-1297, 10.1002/2016GC006655

Kidder, S. B., Hirth, G., Avouac., J. P., Behr.,W., 2016, The influence of stress history on the grain size and microstructure of experimentally deformed quartzite, *Journal of Structural Geology*, v. 83, p.194-206, 10.1016/j.jsg.2015.12.004

Cross, A. J., **Kidder, S. B.**, Prior, D. J., 2015, Using quartz sheared around garnet porphyroclasts to evaluate microstructural evolution in nature, *Journal of Structural Geology*, v. 75, p.17-31, doi:10.1016/j.jsg.2015.02.012

Kidder, S. B., and Prior, D. J., 2014, Reversed scan direction reduces electron beam damage in EBSD maps, *Journal of Microscopy,* 255(2), p. 89-93, doi: 10.1111/jmi.12140

Chapman, A. D., Ducea, M. N., **Kidder, S. B.**, Petrescu, L., 2014, Geochemical constraints on the petrogenesis of the Salinian arc, central California: implications for the origin of intermediate magmas, *Lithos,* v. 200-201, p. 126-141, doi:10.1016/j.lithos.2014.04.011

Kidder, S. B., Herman, F., Saleeby, J. B. , Avouac, J. P., Ducea, M. N., Chapman, A. D., 2013 Shear heating not a cause of inverted metamorphism, *Geology*, v. 41, p. 899-902, doi:10.1130/G34289.1

Kidder, S. B., Avouac, J.P., Chan, Y. C., 2013, Application of titanium-in-quartz thermobarometry to greenschist facies veins and recrystallized quartzites in the Hsuehshan range, Taiwan, *Solid Earth*, 117, B9, doi:110.1029/2012JB009303

Kidder, S. B., Avouac, J.P., Chan, Y. C., 2012, Constraints from rocks in the Taiwan orogen on crustal stress levels and rheology, *Journal of Geophysical Research,* v.117, B09408, doi:10.1029/2012JB009303

Chapman, A. D., Saleeby, J. B., Wood, D. F., Piasecki, A., **Kidder, S. B.**, Ducea, M. N. Farley, K. A., 2012, Late Cretaceous gravitational collapse of the southern Sierra Nevada batholith, California, *Geosphere,* v. 8, no. 2., doi:10.1130/GES00740.1

Chapman, A. D., **Kidder, S. B.**, Saleeby, J. B., and Ducea, M. N., 2010, Role of extrusion of the Rand and Sierra de Salinas schists in Late Cretaceous extension and rotation of the southern Sierra Nevada and vicinity, *Tectonics,* v. 29, doi:10.1029/2009TC002597

Ducea, M. N., **Kidder, S. B.**, Chesley, J. T., and Saleeby, J. B., 2009, Tectonic underplating of trench sediments beneath magmatic arcs: the central California example, *International Geology Review*, v. 51, no. 1, p. 1–26

Ducea, M. N., **Kidder, S. B.**, and Chesley, J. T., 2007, A geologic window into a subduction megathrust, *EOS*, v. 88, no. 27, 3, p. 277–284

Kidder, S. B., and Ducea, M. N., 2006, High temperatures and inverted metamorphism in the schist of Sierra de Salinas, California, *Earth and Planetary Science Letters*, 241, p. 422–437

Barbeau, D. L., Ducea M. N., Gehrels, G. E., **Kidder, S. B.**, Wetmore, P. H., and Saleeby, J. B., 2005, U-Pb detrital-zircon geochronology of northern Salinian basement and cover rocks, *GSA Bulletin*, v. 117; no. 3/4; doi: 10.1130/B25496.1

Brady, R., Ducea M. N., **Kidder, S. B.**, and Saleeby, J. B., 2005, Distribution of radiogenic heat production as a function of depth in the Sierra Nevada Batholith, California, *Lithos*, 86, p. 229–244

Dickinson, W. R., Ducea, M. D., Rosenberg, L. I., Greene, H. G., Graham, S. A., Clark, J. C., Weber, G. E., **Kidder, S. B.**, Ernst, H. G., and Brabb, E. E., 2005, Net Dextral Slip, Neogene San Gregorio-Hosgri fault zone, coastal California: geologic evidence and tectonic implications, *GSA Special Paper, no. 391*

Kidder, S. B., Ducea, M. N., Gehrels, G. C., Patchett, P. J., Vervoort, J., 2003, Tectonic and magmatic development of the Salinian Coast Ridge Belt, California, *Tectonics*, v. 22, no. 5, doi:10.1029/2002TC001409

Ducea, M. N., House, M., **Kidder, S. B.**, 2003, Late Cenozoic denudation and uplift rates in the Santa Lucia Mountains, California, *Geology*, v. 31, no. 2, p. 139–142

Ducea, M. N., **Kidder, S. B.**, Zandt, G., 2003, Arc composition at mid-crustal depths: Insights from the Coast Ridge Belt, Santa Lucia Mountains, California, *Geophysical Research Letters*, v. 30, no. 13. doi:10.1029/2002GL016297

CONFERENCE ABSTRACTS

"*" indicates CCNY student author

*Soleymani, H., **Kidder S. B.**, Hirth, G., and Garapic G., 2018, Microstructural Characteristics of Deformed Quartz Under Non-Steady-State Conditions, Gordon Research Conference on Rock Deformation, Andover, NH

*Soleymani, H., **Kidder S. B.**, Hirth, G., and Garapic G., 2018, Microstructural Characteristics of Deformed Quartz Under Non-Steady-State Conditions, Gordon Research Seminar, Andover, NH

*Soleymani, H., **Kidder, S. B.**, Garapic, G., Hirth, G. H., 2018, Microstructural characteristics of quartz under non-steady state deformation, 2018, Microanalysis Society Electron Backscatter Diffraction (EBSD) Conference, Ann Arbor, MI

Toy, V.T., Denys, P., Easterbrook-Clark, L., Hobbs, B., **Kidder S. B.**, Michailos, K., Munro, M., Ord, A., 2018, A multifractal examination of whether along strike variations in the Alpine Fault geothermal gradient can affect deformation mechanisms and fault strength at the brittle-creep transition, Geophysical Research Abstracts, Vol. 20, EGU General Assembly

Kidder, S. B., Scott, J., Prior, D. J., *Lubicich, E., 2017, Invited: Rapid Grain Size Reduction in the Upper Mantle at a Plate Boundary, *AGU*, New Orleans, LA

*Soleymani, H., **Kidder, S. B.**, Hirth, G., 2017, Microstructural Characteristics of Deformed Quartz Under Non-Steady-State Conditions, *AGU*, New Orleans, LA

*Soleymani, H., **Kidder, S. B.**, and Hirth, G. H., 2017, The Microstructural Evolution of Quartzite During Gradually Increasing Stress. Analog Modeling of Tectonic Processes, Austin, TX

Toy, V.T., Takeshita, T., Czertowicz, T., **Kidder, S. B.** 2017, Inferring rheology and architecture of crustal fault zones from outcrops requires careful consideration of non-steady state

processes., Geological Society of Japan annual meeting, Ehime, Japan.

Kidder, S. B., Toy, V. G., Prior, D. J., Little, T., 2016, The effect of recrystallization on titanium concentrations in quartz, an example from New Zealand's Alpine Fault, *Eos Trans. AGU*, San Francisco, CA

Soleymani, H., **Kidder, S. B.**, Hirth, G. 2016, The Microstructural Evolution of Quartzite During Gradually Increasing Stress, *Eos Trans. AGU*, San Francisco, CA

Kidder, S. B., Toy, V. G., Prior, D. J., Little, T., 2016, The Effect of Recrystallization on Titanium Concentrations in Quartz, an example from New Zealand's Alpine Fault, Gordon Research Conference on Rock Deformation, Andover, NH

*Soleymani, H., **Kidder, S. B.**, and Hirth, G., 2016, The Microstructural Evolution of Quartzite During Gradually Increasing Stress. Gordon Research Conference on Rock Deformation, Andover, NH

*Lubicich, E. J., **Kidder, S. B.**, Scott., J., 2016, Mantle Xenolith Microstructures, Microstructures and Pressure-Temperature Conditions of Peridotite Xenoliths from near the Alpine Fault, New Zealand, *Eos Trans. AGU*, San Francisco, CA

Kidder, S. B., Toy, V. G., Prior, D. J., 2016, The effect of recrystallization on titanium concentrations in quartz, an example from New Zealand's Alpine Fault, *6th International Conference on recrystallization and Grain Growth*, Pittsburgh, PA

*Soleymani, H., **Kidder, S. B.**, 2016, The microstructural evolution of quartzite during gradually increasing stress, *6th International Conference on recrystallization and Grain Growth*, Pittsburgh, PA

*Lubicich, E. J., *Soleymani, H., **Kidder, S. B.**, *Khan, A., *Logozzo, L., Scott., J., 2016, Mantle Xenolith Microstructures, Ti-in-Quartz in Mylonites, and Non-Steady State Recrystallized Grain Size: Ongoing Structure Projects at CCNY, *GSA Abstracts With Programs, NorthEast Section*, Albany, NY

Kidder, S. B., Avouac, J. P., Hirth, G., Toy, V. G., Prior, D. J., 2015, Some Progress with Grain Size Piezometry, *Tectonic Studies Group Annual Meeting*, Ediburgh, Scotland

Kidder, S. B., Toy, V. G., Prior, D. J., 2014, Transient Stress Magnitudes in the Middle Crust along the Alpine Fault, *Eos Trans. AGU*, San Francisco, CA

Kidder, S. B., 2014, Transient Stress Magnitudes in the middle crust along the Alpine Fault, Gordon Research Conference on Rock Deformation, Proctor Academy, NH

Kidder, S. B., 2014, Advances in Quantifying Crustal Stress Magnitudes, *3rd Biennial Structural Geology & Tectonics Forum 2014*, Golden, CO

Kidder, S. B., and Prior, D. J., 2014, Reversed scan direction reduces electron beam damage in EBSD maps, *EBSD 2014 – Electron Backscattered Diffraction Topical Conference*, Pittsburgh, PA

MacRae, C., Wilson, N., Torpy, A., **Kidder, S. B.**, Li, Z., Delle Piane, C., and Dewhurst, D., 2014, Quartz Overgrowths in Shales and Sandstones studied by EPMA and SIMS, IUMAS, Hartford, CT

Kidder, S. B., Avouac, J. P., Hirth, G., Behr, W. 2013, Kinetics of grain size evolution in experimentally deformed quartzite, *5th International Conference on recrystallization and Grain Growth*, Sydney, Australia

Little, T., Gillam, B., Prior, D., **Kidder, S. B.**, Cross, A., Ellis, S., Albot, O, and Toy, V., 2013, Foliation fanning in the hanging wall of the Alpine Fault, Central Southern Alps, Geological Society of New Zealand annual conference, New Zealand

Chapman, A. D., Ducea M. N., **Kidder, S. B.**, Saleeby, J. B., 2012, Igniting a magmatic flare-up: the Salinian arc, central, California, *GSA Abstracts with Programs, Vol. 44, No. 7, p.489*

Kidder, S. B., Avouac, J. P., Chan, Y. C., 2012, Constraints from rocks in the Taiwan orogen on crustal stress levels and rheology, Gordon Research Conference on Rock Deformation, Proctor Academy, NH

Toy, V., Prior, D., **Kidder, S. B.**, Norris, R., Reid, Z., Lindroos, M. B., 2011, The value of paleopiezometry of quartz as a method of estimating flow stress in New Zealand's Alpine Fault Zone, *Eos Trans. AGU*, San Francisco, CA

Kidder, S. B., Avouac, J.P., Chan, Y. C., 2011, Testing Titanium-in-quartz thermobarometry at low temperatures in veins and deformed quartzite, *GSA Abstracts with Programs, Vol. 43, No. 5, p. 94*

Kidder, S. B., Avouac, J.P., Chan, Y. C., Chen, C. T., 2010, Rheology of impure quartzite under geologic conditions, *Eos Trans. AGU, T33E-08,* San Francisco, CA

Kidder, S. B., Hirth, G. H., Avouac, J. P., 2010, Kinetics of grain size evolution in experimentally deformed quartzite, Gordon Research Conference on Rock Deformation, Tilton School, NH

Saleeby, J., Chapman, A. D., **Kidder, S. B.**, 2010, Dispersal of southern Sierra Nevada Batholith (SNB) crustal fragments across and along the trace of the San Andreas Fault (SAF)– What constitutes the central Salinia basement, *GSA Abstracts with Programs, Cordilleran Section*, v. 42, no. 4, p. 43

Chapman, A. D., **Kidder, S. B.**, Saleeby, J. B., and Ducea, M. N., 2009, Role of extrusion of the Rand and Sierra de Salinas schists in Late Cretaceous extension and rotation of the southern Sierra Nevada and vicinity, *GSA Abstracts with Programs,* v. 41, no. 7, p. 590

Ducea, M. N., **Kidder, S. B.**, Saleeby, J. B., 2009, Tectonic underplating of trench sediments beneath magmatic arcs —The Laramide example in the western U.S.A., *GSA Abstracts with Programs,* v. 41, no. 7, p. 589

Kidder, S. B., Herman, F., Saleeby, J. B. , Avouac, J. P., and Ducea, M. N., 2008, A 2D kinematic-thermal model of flat subduction initiation and accretion of the Pelona and related schists of southern California, *GSA Abstracts with Programs, Cordilleran Section*, v. 40, no. 1, p. 48

Kidder, S. B., and Avouac. J. P., 2008, Constraining crustal flow laws with microstructural analysis of rocks exhumed from active orogens, Gordon Research Conference on Rock Deformation, Tilton School, NH

Herman, F., Gurnis, M., Mueller, D. and **Kidder, S. B.**, 2008, Geodynamic modeling of the onset and demise of Cretaceous—Eocene flat subduction in North America, *EGU Geophysical Research Abstracts,* v. 10

Kidder, S. B., Herman, F., Saleeby, J. B., Avouac, J. P., and Ducea, M. N., 2008, 2D kinematic-thermal models of flat subduction initiation and accretion of the Pelona and related schists of southern California, Earth and Planetary Student Research Symposium, UCLA

Kidder, S. B., Herman, F., Saleeby, J. B. , Avouac, J. P., and Ducea, M. N., 2007, Modeling flat subduction initiation and accretion of the Pelona and related schists of southern California, *Eos Trans. AGU,* Abstract T44A-06

Dickinson, W. R., Ducea, M. D., Rosenberg, L. I., Greene, H. G., Graham, S. A., Clark, J. C., Weber, G. E., **Kidder, S. B.**, Ernst, H. G., and Brabb, E. E., 2005, Net Dextral Slip, Neogene San Gregorio-Hosgri fault zone, coastal California: geologic evidence and tectonic implications, *GSA Abstracts with Programs, Cordilleran Section*, v. 37, no. 4

Ducea, M. N., **Kidder, S. B.**, Chesley, J., 2005, Salinia: a crustal cross section through a shallow subduction zone exposing the subduction megathrust, *GSA Abstracts with Programs, Cordilleran Section*, v. 37, no. 4, p. 52

Brady, R., Ducea M. N., **Kidder, S. B.**, and Saleeby, J. B., 2004, Results of radiogenic heat production measurements through the entire thickness of the Sierra Nevada batholith, California: a non-exponential distribution controlled by hydrothermal processes, *GSA Abstracts with Programs,* v. 36, no. 5, p. 342

Kidder, S. B., Ducea M. N., Barbeau, D. L., and Gehrels, G. E., 2004, The Cretaceous Salinian continental arc: Overview and new advances, *GSA Abstracts with Programs,* v. 36, no. 5, p. 342

Kidder, S. B., Ducea, M. N., Gehrels G. G., and Duschatko, B., 2001, A large range of Sr and Nd isotope ratios in a small deep-crustal exposure of a Cretaceous Cordilleran arc: Implications for arc magma evolution, *Eos Trans. AGU*, 82(47), T41C-0884, San Francisco, CA

Bump, A. P., Davis, G. H., Bilinski, G. E., Sanders, A. E., **Kidder, S. B.**, 2000, Progressive development of brittle and semi-brittle structures on the Monument Uplift, Utah, and their implications for regional strain, *GSA Abstracts with Programs, Rocky Mountain Section,* 32; 5, p. 4

Kidder, S. B., and Ducea M. N., 2000, Composition of a Cordilleran arc root and the role of the lower crust in arc magmatism; preliminary evidence from the Santa Lucia Mountains, California, *Eos Trans. AGU*, 81(48), V51A-17, San Francisco, CA