

## **Christian Klimczak**

Department of Geology

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## Professional Appointments

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University of Georgia, Athens GA, Department of Geology, July 2020 – present; Associate Professor

University of Georgia, Athens GA, Department of Geology, August 2014 – June 2020; Assistant Professor

University of Tennessee, Knoxville TN, Department of Earth and Planetary Sciences, April 2018 – present; Adjunct Assistant Professor

Carnegie Institution of Washington, Washington, DC; Department of Terrestrial Magnetism, May 2014 – July 2018; Visiting Investigator

Carnegie Institution of Washington, Washington, DC; Department of Terrestrial Magnetism, May 2011 – March 2014; MESSENGER Postdoctoral Fellowship

## Education

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University of Nevada, Reno, NV; Department of Geological Sciences and Engineering, Fall 2007 – Spring 2011; Doctor of Philosophy

Freie Universität Berlin, Germany; Fachbereich Geowissenschaften, Summer 2001 – Winter 2006/2007; Diplom (M.S. equivalent)

## Research Interests

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- Fault and fracture growth
- Tectonic and volcanic evolution of the terrestrial planets
- Rock-mechanical properties of fractured rock volumes
- Fluid-fracture interactions

## Industry Experience

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- MPH Consulting; Senior field geologist (Uranium exploration), June–August 2007
- Pinnacle, a Halliburton Service; Summer intern (Hydrofracturing), June–August 2009

## Languages

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- German (mother tongue)
- English (proficient)
- French (basic communication skills)
- Spanish (basic communication skills)

## Professional Memberships

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- American Association of Petroleum Geologists (2007– present)
- Geological Society of America (2009 – present)
- American Geophysical Union (2008 – 2020)
- American Association for the Advancement of Science (2011 – 2014)
- Association of Environmental & Engineering Geologists (2016 – 2017)

## Honors

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- Marie Curie Summer School 2008, Porous and Aqueous Materials (\$500)
- Outstanding International Graduate Student 2009, University of Nevada, Reno (\$1500)
- Viola Vestal Coulter Graduate Scholarship 2009/2010, University of Nevada, Reno (\$1500)
- R. D. Call Scholarship 2010, Call & Nicolas, Inc. (\$2000)
- Outstanding Ph.D. graduate in geosciences 2011, University of Nevada, Reno
- NASA Group Achievement Award, MESSENGER Project Team, June 2017
- M. G. Michael Award 2021, Franklin College, University of Georgia (\$3000)

## Grant Support

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- Comparing the morphological variability of shortening landforms on Mars and Mercury, NASA Solar System Workings Program; Period: August 1, 2021 to July 31, 2024; Role: PI, Amount: \$ 364,889
- Do Polygonal Impact Craters Form on Mercury's Lobate Scarps? Implications for Contractual Tectonism throughout the Solar System. NASA Discovery Data Analysis Program, June 1, 2021 to May 31, 2024, Role: Co-I, Amount: \$ 30,017
- Searching for Deep-seated Thrust Faults on the Moon, NASA Lunar Data Analysis Program, July 1, 2017 to August 31, 2020, Role: Co-I, Amount: \$ 213,998
- The Architecture of Wrinkle Ridges in the Northern Volcanic Plains of Mercury, NASA Discovery Data Analysis Program, August 1, 2016 to July 31, 2018, Role: Co-I, Amount: \$ 67,299
- Characterizing the Geomorphology of Lunar Grabens, NASA Lunar Data Analysis Program; Period: January 1, 2016 to December 31, 2018; Role: PI, Amount: \$ 150,338
- Three-dimensional Scaling of Large Thrust Faults on Mars, NASA Mars Data Analysis Program; Period: October 1, 2014 to September 30, 2018; Role: PI, Amount: \$ 157,581

## Service to the Profession and Community Involvement

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- Mercury Exploration Assessment Group (MExAG) steering committee Geology Discipline Member, 2020 – 2023
- NASA Review Panels
- Reviewer for peer-review journals (Journal of Geophysical Research, Geophysical Research Letters, Icarus, Hydrogeology, Meteoritics and Planetary Science, Nature Astronomy)

## Development, Service, and Outreach

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- Preparing to Pivot Course, July 2020
- Conflict De-escalation Training, February 2018
- Campus Active Shooter Training, November 2017
- UGA Sustainability Across the Curriculum Teaching Workshop 2017

- AAPG UGA student chapter mentor (2015 – 2016)
- AEG UGA student chapter mentor (2016 – 2017)
- Student Spaceflight Experiment Program; Review Board Missions 2 and 3

### Course Instruction

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- GEOL 100 Earthquakes, Volcanoes, and Natural Disasters, teaching assistant at UNR, Fall 2007.
- GPH 333 Plate Tectonics and Earth Physics, teaching assistant at UNR, Spring 2008, 2010, 2011.
- GEOL 332 Structural Geology, teaching assistant at UNR, Fall 2009, 2010.
- GEOL 1121 Earth Processes and Environments, instructor of record at UGA, Fall 2015 – 2020, Fall 2022.
- GEOL 3000 Alien Worlds in our Backyard, instructor of record at UGA, Fall 2021.
- GEOL 4060/6060 Structural Geology, instructor of record at UGA, Spring 2015 – 2023.
- GEOL 4270/6270 Geology Field School, instructor of record at UGA, Summer 2018 – 2022.
- GEOL 4360/6360 Introduction to Rock Mechanics, instructor of record at UGA, Spring 2016, Fall 2017, 2019, 2021.
- GEOL 3000 Alien Worlds in our Backyards instructor of record at UGA, Fall 2021.
- GEOL 4490 Research in Structure/Tectonics (directed study).
- GEOL 8090 Advanced Topics in Structural Geology (directed study).

### Graduate Committees

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- Corbin Kling (UGA, M.S. 2016); Role: Main Advisor
- E. Quentin Anlian (UGA, M.S. 2017); Role: Main Advisor
- Erik Alberts (UGA, M.S. 2017); Role: Committee Member
- Devon Verellen (UGA, M.S. 2017); Role: Committee Member
- Rose Borden (UTK, M.S. 2018); Role: External Committee Member
- Kelsey Crane (UGA, Ph. D. 2019); Role: Main Advisor
- William Jenkins (UGA, M.S. 2019); Role: Main Advisor
- Andrew Clements (UGA, M.S. 2019); Role: Committee Member
- Sierra Ramsey (UGA, M.S. 2020); Role: Main Advisor
- Melanie Callihan (UGA, Ph.D. 2020); Role: Main Advisor
- Gustavo Larramendi (UGA, M.S. 2020); Role: Committee Member
- Barrett Jordan (UGA, M.S. 2020); Role: Committee Member
- Rachel Rotz (UGA, Ph.D. 2020); Role: Committee Member
- Laura Fackrell (UGA, Ph.D. 2021); Role: Committee Member
- Işık Su Yazıcı (UGA, M.S. 2021); Role: Main Advisor
- Hiu Ching Jupiter Cheng (UGA, Ph.D. 2023); Role: Main Advisor
- Michael Cuilik (UGA, M.S. 2022); Role: Committee Member
- Laura Hannawalt (UGA, M.S. student, expected 2022); Role: Committee Member
- Sydney Briggs (UGA, M.S. 2023; Ph.D. student, expected 2027); Role: Main Advisor
- Stephan Loveless (UGA, Ph.D. candidate, expected 2025); Role: Main Advisor
- Abubakar Aliyu (UGA, M.S. student, expected 2024); Role: Main Advisor
- Leta McCullough (MS State, M.S. student, expected 2023); Role: External Committee Member
- Morgan Lewis (UTK, Ph.D. student, expected 2025); Role: External Committee Member

## Undergraduate Research Mentoring and Senior Theses

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- Iona Summerson, B.S. 2012 (Université II Montpellier) Deformation Bands in the Orange Quarry, Provence, France
- Mya Habermann, B.S. 2015 (UGA) Pyroclastic Volcanism on Mercury
- Anthony Arbise, B.S. 2018 (UGA) Strike-slip Tectonics on Europa
- Patrick Trent, B.S. 2019 (UGA) Petrographic analysis of hydrothermally altered Bishop Tuff, California
- Cash Owens, B.S. 2020 (UGA) Geologic History and Lava-Fracture Interaction at King's Bowl, Craters of the Moon National Monument, Idaho.
- Davis Hardin, B.S. student, expected 2023 (UGA) Investigating a Crater Saturation Equilibrium on Asteroid 4 Vesta.

## Community White Papers

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- **Klimczak, C.**, Beddingfield, C., Byrne, P. K., Cheng, H. C. J., Crane, K. T., and Annex, A. +28 signatories: Opportunities and Challenges for Structural Geology and Tectonics in the Planetary Sciences. 2020. White paper submitted to the Planetary Science and Astrobiology Decadal Survey 2023-2032.
- Vander Kaaden, K. E., Vervack, R. J., Rampe, E., McCubbin, F. M., **Klimczak, C.**, Cline, C. J., II, Byrne, P. K., and Azures, B. A.: Recommended laboratory and field studies ahead of future Mercury exploration. 2020. White paper submitted to the Planetary Science and Astrobiology Decadal Survey 2023-2032.
- Hauck, S. A., II, Blewett, D., Byrne, P. K., Chabot, N. L., Ernst, C. M., Johnson, C. L., Mazarico, E., Raines, J. M., Vander Kaaden, K. E., Vervack, R. J., Deutsch A., DiBraccio, G., Imber, S., **Klimczak, C.**, and Poh, G.: Fundamental and Interdisciplinary Questions Drive the Scientific Exploration of Mercury. 2020. White paper submitted to the Planetary Science and Astrobiology Decadal Survey 2023-2032.
- Vander Kaaden, K. E, Hauck, S. A., Ernst, C. M., Vervack, R. J., Jr., **Klimczak, C.**, Johnson C. L., DiBraccio, G., Deutsch, A. N., Poh, G., and Imber, S.: The Next Decade of Funding Opportunities for Mercury-Related Science and Mission Support. White paper submitted to the Planetary Science and Astrobiology Decadal Survey 2023-2032.

## Peer-reviewed Publications

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### 2023

45. Collins, M. S., Byrne, P. K., **Klimczak, C.**, and Mazarico, E.: Thrust Faults Bound an Elevated Mantle Plug Beneath Several Lunar Basins. *Journal of Geophysical Research (Planets)*, 128, e2022JE007682. doi:10.1029/2022JE007682
44. **Klimczak C.** and McCarthy, C.: Planetary Geomechanics. In: Klimczak, C., Collins, G., and Byrne, P. K.: *Comparative Tectonism across the Solar System*. (Chapter 3), Book chapter *Accepted Book Chapter*.

### 2022

43. Cheng, H. C. J., and **Klimczak, C.**: Structural relationships in and around the Rheasilvia basin on Vesta. *Journal of Structural Geology* 161, 104677, 2022. doi:10.1016/j.jsg.2022.104677
42. Cheng, H. C. J., and **Klimczak, C.**: Large-scale troughs on Asteroid 4 Vesta accommodate opening-mode displacement. *Journal of Geophysical Research (Planets)*, 127, e2021JE007130. doi:10.1029/2021JE007130

## 2021

41. Byrne, P. K., Ghail, R. C., Şengör A. M. C., James, P. B., **Klimczak C.**, and Solomon, S. C.: A Globally Fragmented and Mobile Lithosphere on Venus. *Proceedings of the National Academy of Sciences of the United States of America*, 118, e2025919118, 2021. doi:10.1073/pnas.2025919118
40. Byrne, P. K., Ghail, R. C., Gilmore, M. S., Şengör A. M. C., **Klimczak C.**, Senske, D. A., Whitten, J. L., Khawja, S., Ernst, R. E., and Solomon, S. C.: Venus tesserae feature layered, folded, and eroded rocks. *Geology* 46, 81–85, 2021. doi:10.1130/G47940.1
39. Cheng, H. C. J., **Klimczak, C.** and Fassett, C. I.: Age relationships of large-scale troughs and impact basins on Vesta. *Icarus* 366, 114512, 2021. doi:10.1016/j.icarus.2021.114512
38. Jenkins, W. T., **Klimczak C.**, Trent, P. M., and Crowe, D. E.: Fumarolic pathways were structurally controlled by a strike-slip fault system beneath the Bishop Tuff, Bishop, California. *Minerals* 11, 1167. doi:10.3390/min11111167

## 2019

37. Callihan, M. B., and **Klimczak, C.**: Topographic Expressions of Lunar Graben. *Lithosphere* 11, 294–305, 2019. doi:10.1130/L1025.1.
36. Crane, K. T., and **Klimczak, C.**: A 3-D Structural Model of the Saddle Mountains, Yakima Fold Province Washington, USA: Implications for Late Tertiary Tectonic Evolution of the Columbia River Flood Basalt Province. *Tectonophysics* 766, 1–13, 2019. doi: 10.1016/j.tecto.2019.05.015.
35. Crane, K. T., and **Klimczak, C.**: Tectonic Patterns of Shortening Landforms in Mercury's Northern Smooth Plains. *Icarus* 317, 66–80, 2019. doi:10.1016/j.icarus.2018.05.034.
34. **Klimczak, C.**, Byrne, P. K., Şengör, A. M. C., and Solomon, S. C.: Principles of structural geology on rocky planets. *Canadian Journal of Earth Sciences*, 56, 1437–1457, 2019. doi:10.1139/cjes-2019-0065.

## 2018

33. Byrne, P. K., **Klimczak, C.**, and Şengör, A. M. C.: The Tectonic Character of Mercury. In: Solomon, S. C., Nittler, L. R., and Anderson, B. J.: *Mercury: The View after MESSENGER* (Chapter 10), 249–286, 2018, Cambridge Planetary Science.
32. Byrne, P. K., Whitten, J. L., **Klimczak, C.**, McCubbin, F. M., and Ostrach, L. R.: The Volcanic Character of Mercury. In: Solomon, S. C., Nittler, L. R., and Anderson, B. J.: *Mercury: The View after MESSENGER* (Chapter 11), 287–323, 2018, Cambridge Planetary Science.
31. **Klimczak, C.**, Kling, C. L., and Byrne P. K.: Topographic Expressions of Large Thrust Faults on Mars. *Journal of Geophysical Research (Planets)*, 123, 1973–1995, 2018. doi:10.1029/2017JE005448.



30. **Klimczak, C.**, Crane, K. T., Habermann, M. A., and Byrne P. K.: The spatial distribution of Mercury's pyroclastic activity and the relation to lithospheric weaknesses. *Icarus* 315, 115–123, 2018. doi:10.1016/j.icarus.2018.06.020.

## 2017

29. Crane K. T., and **Klimczak, C.**: Timing and rate of Global Contraction on Mercury. *Geophysical Research Letters* 44, 3082–3089, 2017. doi: 10.1002/2017GL072711.

## 2016

28. Byrne, P. K., Ostrach, L. R., Fassett, C. I., Chapman, C. R., Denevi, B. W., Evans, A. J., **Klimczak, C.**, Banks, M. E., Head, J. W., and Solomon, S. C.: Widespread effusive volcanism on Mercury likely ended by about 3.5 Ga. *Geophysical Research Letters* 43, 7408–7416, 2016. doi:10.1002/2016GL069412.
27. Weider, S. Z., Nittler, L. R., Murchie, S. L., Peplowski, P. N., McCoy, T. J., Kerber, L., **Klimczak, C.**, Ernst, C. M., Goudge, T. A., Starr, R. D., Izenberg, N. R., Klima, R. L., and Solomon, S. C.: Evidence from MESSENGER for sulfur- and carbon-driven explosive volcanism on Mercury. *Geophysical Research Letters* 43, 3653–3661, 2016. doi:10.1002/2016GL068325.

## 2015

26. Banks, M. E., Xiao, Z., Watters, T. R., Strom, R. G., Braden, S. E., Chapman, C. R., Solomon, S. C., **Klimczak, C.**, and Byrne, P. K.: Duration of Activity on Lobate-Scarp Thrust Faults on Mercury. *Journal of Geophysical Research (Planets)* 120, 1751–1762, 2015. doi: 10.1002/2015JE004828.
25. Byrne, P. K., **Klimczak, C.**, McGovern, P. J., Mazarico, E., James, P. B., Neumann, G. A., Zuber, M. T., and Solomon, S. C.: Deep-seated reverse faults bound the Mare Crisium lunar mascon. *Earth and Planetary Science Letters* 427, 183–190, 2015. doi:10.1016/j.epsl.2015.06.022
24. Ernst, C. M., Denevi, B. W., Barnouin, O. S., **Klimczak, C.**, Chabot, N. L., Head, J. W., Murchie, S. L., Neumann, G. A., Prockter, L. M., Robinson, M. S., Solomon, S. C., Watters, T. R.: Volcanic Plains in Caloris Basin: Thickness, Timing, and What Lies Beneath. *Icarus* 250, 413–429, 2015. doi:10.1016/j.icarus.2014.11.003
23. Ferrari, S., Massironi, M., Marchi, S., Byrne, P. K., **Klimczak, C.**, Martellato, E., and Cremonese, G.: Age relations of the Rembrandt basin and associated scarp system, Mercury. In: *Platz, T., Massironi, M., Byrne, P. K. & Hiesinger, H. (eds) Volcanism and Tectonism Across the Inner Solar System. Geological Society, London, Special Publications 401, 159–172, 2015. doi:10.1144/SP401.20.*
22. **Klimczak, C.**, Byrne, P. K., and Solomon, S. C.: A rock-mechanical assessment of Mercury's global tectonic fabric. *Earth and Planetary Science Letters* 416, 82–90, 2015. doi:10.1016/j.epsl.2015.02.003
21. **Klimczak, C.**: Brittle strength of planetary lithospheres undergoing global contraction. *Journal of Geophysical Research (Planets)* 120, 2135–2151, 2015. doi: 10.1002/2015JE004851.

## 2014

20. Byrne, P. K., **Klimczak, C.**, Şengör, A. M. C., Solomon, S. C., Watters, T. R., and Hauck II, S. A.: Mercury's global contraction much greater than earlier estimates. *Nature Geoscience* 7, 301–307, 2014. doi:10.1038/NGEO2097.
19. **Klimczak, C.**: Geomorphology of Lunar Grabens Requires Igneous Dikes at Depth. *Geology* 42, 963–966, 2014. doi:10.1130/G35984.1.
18. Xiao, Z., Strom, R. G., Chapman, C. R., Head, J. W., **Klimczak, C.**, Ostrach, L. R., Helbert, J., and D'Incecco, P.: Controlling factors in impact excavation processes: Insights from comparisons of fresh complex impact craters on Mercury and the Moon. *Icarus* 228, 260–275, 2014. doi:10.1016/j.icarus.2013.10.002.

## 2013

17. Blair, D. M., Freed, A. M., Watters, T. R., Byrne, P. K., **Klimczak, C.**, Prockter, L. M., Ernst, C. M., Solomon, S. C., Melosh, H. J., and Zuber, M. T.: The origin of graben and ridges in Rachmaninoff, Raditladi, and Mozart basins, Mercury. *Journal of Geophysical Research (Planets)* 118, 47–58, 2013. doi:10.1029/2012JE004198.
16. Byrne, P. K., **Klimczak, C.**, Williams D. A., Hurwitz, D. M., Solomon, S. C., Head, J. W., Preusker, F., and Oberst, J.: An Assemblage of Lava Flow Features on Mercury. *Journal of Geophysical Research (Planets)* 118, 1303–1322, 2013. doi:10.1002/jgre.20052.
15. Denevi, B. W., Ernst, C. M., Meyer, H. M., Robinson, M. S., Murchie, S. L., Whitten, J. L., Head, J. W., Watters, T. R., Solomon, S. C., Ostrach, L. R., Chapman, C. R., Byrne, P. K., **Klimczak, C.**, and Peplowski, P. N.: The Distribution and Origin of Smooth Plains on Mercury. *Journal of Geophysical Research (Planets)* 118, 891–907, 2013. doi:10.1002/jgre.20075.
14. **Klimczak, C.**, Ernst, C. M., Byrne, P. K., Solomon, S. C., Watters, T. R., Murchie, S. L., Preusker, F., and Balcerski, J. A.: Insights into the subsurface structure of the Caloris basin, Mercury, from assessments of mechanical layering and changes in long-wavelength topography. *Journal of Geophysical Research (Planets)* 118, 2030–2044, 2013. doi:10.1002/jgre.20157.
13. **Klimczak, C.**, and Schultz, R. A.: Shear-enhanced compaction in dilating granular materials. *International Journal of Rock Mechanics and Mining Sciences* 64, 139–147, 2013. doi:10.1016/j.ijrmms.2013.08.012.
12. **Klimczak, C.**, and Schultz, R. A.: Fault damage zone origin of the Teufelsmauer, Subhercynian Cretaceous Basin, Germany. *International Journal of Earth Sciences/Geologische Rundschau* 102, 121–138, 2013. doi:10.1007/s00531-012-0794-z.
11. Schultz, R. A., **Klimczak, C.**, Fossen, H., Olson, J. E., Exner, U., Reeves, D. M., and Soliva, R.: Statistical tests of scaling relationships for geologic structures. *Journal of Structural Geology* 48, 85–94, 2013. doi:10.1016/j.jsg.2012.12.005.

## 2012

10. Fassett, C. I., Head, J. W., Baker, D. M., Zuber, M. T., Smith, D. E., Neumann, G. A., Solomon, S. C., **Klimczak, C.**, Strom, R. G., Chapman, C. R., Prockter, L. M., Phillips, R. J., Oberst J., and Preusker, F.: Large impact basins on Mercury: Global distribution, characteristics, and modification history from MESSENGER orbital data. *Journal of Geophysical Research (Planets)* 117, E00L08, 2012. doi:10.1029/2012JE004154.

9. Freed, A. M., Blair, D. M., Watters, T. R., **Klimczak, C.**, Byrne, P. K., Solomon, S. C., Zuber, M. T., and Melosh, H. J.: On the Origin of Graben and Ridges within and near Volcanically Buried Craters and Basins in Mercury's Northern Plains. *Journal of Geophysical Research (Planets)* 117, E00L06, 2012. doi:10.1029/2012JE004119.
8. **Klimczak, C.**, Watters, T. R., Ernst, C. M., Freed, A. M., Byrne, P. K., Solomon S. C., Blair, D. M., and Head, J. W.: Deformation associated with ghost craters and basins in volcanic smooth plains on Mercury: Strain analysis and implications for plains evolution. *Journal of Geophysical Research (Planets)* 117, E00L03, 2012. doi:10.1029/2012JE004100.
7. Watters, T. R., Solomon S. C., **Klimczak, C.**, Freed, A. M., Head, J. W., Ernst, C. M., Blair, D. M., Goudge, T. A., and Byrne, P. K.: Extension and Contraction within Volcanically Buried Impact Craters and Basins on Mercury. *Geology* 40, 1123–1126, 2012. doi:10.1130/G33725.1.
6. Zuber, M. T., Smith, D. E., Phillips, R. J., Solomon, S. C., Neumann, G. A., Hauck II, S. A., Peale, S. J., Barnouin, O. S., Head, J. W., Johnson, C. L., Lemoine, F. G., Mazarico, E., Sun, X., Torrence, M. H., Freed, A. M., **Klimczak, C.**, Margot, J.-L., Oberst, J., Perry, M. E., McNutt, R. L., Jr., Balcerski, J. A., Michel, N., Talpe, M. J., and Yang, D.: Topography of the Northern Hemisphere of Mercury from MESSENGER Laser Altimetry. *Science* 336, 217–220, 2012. doi:10.1126/science.1218805.

## 2011

5. Head, J. W., Chapman, C. R., Strom, R. G., Fassett, C. I., Denevi, B. W., Blewett, D. T., Ernst, C. M., Watters, T. R., Solomon, S. C., Murchie, S. L., Prockter, L. M., Chabot, N. L., Gillis-Davis, J. J., Whitten, J., Goudge, T. A., Baker, D. M., Hurwitz, D. M., Ostrach, L. R., Xiao, Z., Merline, W. J., Kerber, L. A., Dickson, J. L., Oberst, J., Byrne, P. K., **Klimczak, C.**, and Nittler, L. R.: Flood Volcanism in the Northern High Latitudes of Mercury Revealed by MESSENGER. *Science* 333, 1853–1856, 2011. doi:10.1126/science.1211997.
4. **Klimczak, C.**, Soliva, R., Schultz, R. A., and Chery, J.: Sequential growth of deformation bands in a multilayer sequence. *Journal of Geophysical Research (Solid Earth)* 116, B09209, 2011. doi:10.1029/2011JB008365.

## 2010

3. **Klimczak, C.**, Schultz R. A., Parashar, R., and Reeves, D. M.: Cubic Law with correlated aperture to length and implications for network scale fluid flow. *Hydrogeology Journal* 18, 851-862, 2010. doi:10.1007/s10040-009-0572-6.
2. **Klimczak, C.**, Schultz, R. A., and Nahm, A. L.: Evaluation of the origin hypotheses of Pantheon Fossae, central Caloris basin, Mercury. *Icarus* 209, 262–270, 2010. doi:10.1016/j.icarus.2010.04.014.

## 2007

1. **Klimczak, C.**, Wittek, A., Doman, D., and Riller, U.: Fold origin of the NE-lobe of the Sudbury Basin, Canada: Evidence from heterogeneous fabric development in the Onaping Formation and the Sudbury Igneous Complex. *Journal of Structural Geology* 29, 1744–1756, 2007. doi:10.1016/j.jsg.2007.09.003.



2022

133. Beddingfield, C., Cartwright, R., Crane, K., and **Klimczak, C.**: Polygonal impact craters on Mercury's lobate scarps: Implications for contractional tectonism throughout the solar system. *Geological Society of America Abstracts with Programs*, vol. 54, no. 5, doi: 10.1130/abs/2022AM-377737, Denver, CO/virtual.
132. Bernhardt, H., Clark, J. D., Preusker, F., **Klimczak, C.**, Banks M. E., Williams, D. A., Nelson, D. M., and Watters, T. R.: Global map and parameter catalog of shortening structures on Mercury using novel high-resolution topography data. Annual Meeting of the Planetary Geologic Mappers, 2022, #7018, Flagstaff, AZ/virtual.
131. Byrne, P. K., Ghail, R. C., James, P. B., **Klimczak, C.**, Şengör, A. M. C., and Solomon, S. C.: Recent and Possibly Ongoing Formation of Tesserated Rocks on Venus. *53<sup>rd</sup> Lunar and Planetary Science Conference*, 2022, #1197, virtual meeting.
130. Clark, J. D., Bernhardt, H., Preusker, F., **Klimczak, C.**, Banks M. E., Williams, D. A., Nelson, D. M., and Watters, T. R.: Characterizing Mercury's History of Global Contraction by Cataloging and Dating Shortening Structures: Initial Results for the H-11 Discovery Quadrangle. *American Geophysical Union, Fall Meeting*, 2022, P22C-2105, Chicago, IL, USA.
129. Cheng, H. C. J., **Klimczak, C.**, and Mrazek, J: Displacement-Length Scaling of the Mixed-Mode Koa'e Fault Zone, Hawai'i, HI. *American Geophysical Union, Fall Meeting*, 2022, T12E-0126, Chicago, IL, USA.
128. Cheng, H. C. J., and **Klimczak, C.**: Tectonic Map of Ceres from Polygonal Impact Craters. *53<sup>rd</sup> Lunar and Planetary Science Conference*, 2022, #1021, virtual meeting.

2021

127. Cheng, H. C. J., and Klimczak, C.: A Structural Map of the Rheasilvia basin on Vesta: *Geological Society of America Abstracts with Programs*, 2021, vol. 53, no. 6, doi:10.1130/abs/2021AM-366538, Portland, OR, USA.
126. Cheng H. C. J., **Klimczak, C.**, and Fassett C. I.: Age relationships of large-scale troughs and impact basins on Vesta. *52<sup>nd</sup> Lunar and Planetary Science Conference*, 2021, #1014, virtual meeting.
125. Cheng H. C. J., and **Klimczak, C.**: Systematic fracture pattern on Vesta revealed by polygonal impact craters. *52<sup>nd</sup> Lunar and Planetary Science Conference*, 2021, #1015, virtual meeting.
124. Cheng H. C. J., and **Klimczak, C.**: The large-scale troughs on Asteroid 4 Vesta are opening-mode fractures. *EGU General Assembly*, 2021, online, 19–30 Apr 2021, EGU21-79.
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116. Bernhardt H., Williams D. A., and **Klimczak C.**: Mars' Oldest and Largest Caldera Pityusa Patera — Unique Deposits Hint at Magma Chamber at Crust-Mantle Boundary. *51<sup>st</sup> Lunar and Planetary Science Conference*, 2020, #1087, Houston, TX, USA.
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- Titan, and Ganymede. *49<sup>th</sup> Lunar and Planetary Science Conference*, 2018, #2905, Houston, TX, USA.
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  95. Jenkins, W. T., **Klimczak C.**, and Crowe, D. E.: Effects of a Blind Strike-Slip Fault System on Hydrothermal Activity and Structure in the Bishop Tuff, CA. *Geological Society of America, Annual Meeting*, 2018, vol. 50, no. 6, #47-17, Indianapolis, IN, USA.
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61. Kling, C. L., and **Klimczak, C.**: Thrust fault displacement distributions at the Phlegra Montes lobate scarp system, Mars. *46<sup>th</sup> Lunar and Planetary Science Conference*, 2015, #1557, Houston, TX, USA.
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33. Byrne, P. K., Watters, T. R., Murchie, S. L., **Klimczak, C.**, Solomon, S. C., Prockter, L. M., and Freed, A. M.: A tectonic survey of the Caloris basin, Mercury, *43<sup>rd</sup> Lunar and Planetary Science Conference*, 2012, p. 1722, Houston, TX, USA.
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27. **Klimczak, C.**, Ernst, C. M., Byrne, P. K., Solomon, S. C., and Watters, T. R.: Fault Restriction in the Caloris Smooth Plains: Implications for Mechanical Stratigraphy. *43<sup>rd</sup> Lunar and Planetary Science Conference*, 2012, #1659, Houston, TX, USA.
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  11. Watters, T. R., Byrne, P. K., **Klimczak, C.**, Enns, A. C., Banks, M. E., Walsh, L. S., Ernst, C. M., Robinson, M. S., Gillis-Davis, J. J., Solomon, S. C., Strom, R. G., and Gwinner, K.: The



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#### 2010

10. **Klimczak, C.**, Soliva, R., Schultz, R. A., Chery, J., and Summerson, I.: Growth of deformation bands in a multilayer sequence. *American Geophysical Union Fall Meeting*, 2010, T41B-2130, San Francisco, CA, USA.

#### 2009

9. **Klimczak, C.**, Nahm, A. L., and Schultz, R. A.: Evaluation of the Origin Hypotheses of Pantheon Fossae, Mercury. *40<sup>th</sup> Lunar and Planetary Science Conference*, 2009, #1251, Houston, TX, USA.
8. **Klimczak, C.** and Schultz, R. A.: Strain localization in porous sandstone associated with the Northern Harz Mountains Border Fault, Germany. *American Geophysical Union Fall Meeting*, 2009, T43A-2050, San Francisco, CA, USA.

#### 2008

7. **Klimczak, C.**, Wittek, A., Doman, D., and Riller, U.: Heterogeneous fabric development in the Onaping Formation and the Sudbury Igneous Complex as indications for a fold origin of the NE-lobe of the Sudbury basin, Canada. *39<sup>th</sup> Lunar and Planetary Science Conference*, 2008, #1391, Houston, TX, USA.
6. **Klimczak, C.** and Schultz, R. A.: Cubic law for fluid flow becomes quintic: An extension of the parallel plate model to natural fracture sets. *Marie Curie Summer School – Knowledge Based Materials (Aqueous and Porous Materials)*, 2008, Třešt, Czech Republic.
5. **Klimczak, C.**, Schultz R. A., Parasar, R., and Reeves, D. M.: The Cubic Law Re-evaluated: Quintic Law for Joint Sets. *American Geophysical Union Fall Meeting*, 2008, H31B-0832, San Francisco, CA, USA.

#### 2007 and before

4. **Klimczak, C.** and Riller, U.: Deformation of the Onaping Formation in the NE-lobe of the Sudbury Igneous Complex, Canada: Evidence for fold adjustment flow in the core of a km-scale fold. *11. Symposium “Tektonik, Struktur- und Kristallingeologie”*, 2006, Göttingen, Germany.
3. **Klimczak, C.** and Riller, U.: Fold-origin of the Sudbury Igneous Complex, Canada: Fold-adjustment flow in the core of its NE-lobe. *IODP-ICDP Kolloquium*, 2006, Greifswald, Germany.
2. **Klimczak, C.**, Wittek, A., Doman D., and Riller, U.: Deformation of the Onaping Formation: Mechanisms of orogenic folding of the central Sudbury Impact Structure, Canada. *Impact craters as indicators for planetary environmental evolution and astrobiology conference*, 2006, Lockne, Sweden.

1. Grieve, R., Riller U., and **Klimczak, C.**: Potential new constraints on deformation at the Sudbury Structure, Canada. *15<sup>th</sup> Deformation Mechanisms, Rheology and Tectonics*, 2005, Zurich, Switzerland.

### Invited Lectures

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26. Signatures of Planetary Tectonics: Examples from Asteroid 4 Vesta and Mercury. September 2022, *Invited seminar* at the Georgia State University, Atlanta, GA.
25. Deciphering global tectonic patterns on Mercury. September 2021, *Invited seminar* at the Georgia Institute of Technology, Atlanta, GA.
24. Towards unriddling global tectonic patterns on Mercury. March 2021, *Invited seminar* at the Illinois State University, Normal, IL.
23. The Tectonics of Mercury. February 2021, *Invited Lecture* at University of Edinburgh, UK.
22. Interactions of Faulting and Volcanism: Examples from Earth, Mercury, and Beyond. November 2019, *Invited Lecture* at University of Alabama, Tuscaloosa, AL.
21. Amount, Timing, and Rate of Global Contraction on Mercury. January 2018, *Invited Lecture* at Ernst Moritz Arndt Universität Greifswald, Germany.
20. Deep-Seated Thrust Faults in Mare Crisium, the Moon. January 2018, *Invited seminar* at the Universität Hamburg, Germany.
19. The Tectonics of Mercury. December 2016, *Invited seminar* at the University of South Carolina, Columbia, SC.
18. Tectonic geomorphology as a tool to understand the structural geologic history of the Moon. November 2015, *Invited seminar* at the University of Illinois at Chicago, Chicago, IL.
17. The surface Geology on Mercury. June 2015, *Invited Presentation* at the 5<sup>th</sup> MESSENGER-BepiColombo Joint Science Meeting, Berlin, Germany.
16. Tectonic geomorphology as a tool to understand the structural geologic history of the Moon. June 2015, *Invited seminar* at the Lunar and Planetary Institute, Houston, TX.
15. The MESSENGER mission to Mercury: The geology of the innermost planet as seen after 4 years of orbital observations. April 2015, *Invited seminar* at Tulane University, New Orleans, LA.
14. Thrust Fault Tectonics on Rocky Planets. March 2015, *Invited seminar* at the University of Tennessee, Knoxville, TN.
13. The MESSENGER mission to Mercury: The geology of the innermost planet as seen after 4 years of orbital observations. March 2015, *Brownbag talk* at the University of Tennessee, Knoxville, TN.
12. The MESSENGER mission to Mercury: The geology of the innermost planet as seen after almost 4 years of orbital observations. November 2014, *Invited seminar* at the Georgia Institute of Technology, Atlanta, GA.
11. Nature and relative timing of tectonics and volcanism on Mercury. June 2014, *Invited seminar* at the German Aerospace Center (DLR), Berlin, Germany.

10. Thrust Fault Tectonics on Earth and Mercury. March 2014, *Invited Seminar* at the University of Georgia, Athens, GA.
9. Thrust Fault Tectonics on Earth and Mercury. February 2014, *Invited Seminar* at the University of Missouri, Columbia, MO.
8. Mercury: Tectonic Processes on a Contracting Planet. December 2013, *Invited Seminar* at the University of California Los Angeles, Los Angeles, CA.
7. Tectonic Controls of Volcanism on One-Plate Planets. November 2013, *Invited Seminar* at the University of Colorado, Boulder, CO.
6. Igneous Dikes on the Moon and Mercury. September 2013, *Invited Seminar* at the Goddard Space and Flight Center, Greenbelt, MD.
5. Long-wavelength topographic changes on Mercury. April 2013, *Contributed Presentation* at the 4<sup>th</sup> MESSENGER-BepiColombo Joint Science Meeting, Chicago, IL.
4. Large-scale lithospheric deformation on Mercury. March 2013, *Invited Seminar* at the Virginia Polytechnic Institute, Blacksburg, VA.
3. Faults and Folds on Mercury. May 2012, *Invited seminar* at the Lunar and Planetary Institute, Houston, TX.
2. Fracturing behavior of geological materials during volumetric, brittle deformation. September 2011, *Seminar* at the Carnegie Institution of Washington, Washington, DC.
1. Deformation bands in sandstone: An example from the Subhercynian Cretaceous Basin, Germany. January 2010, *Invited lecture* at Geoforschungszentrum (GFZ) Potsdam, Germany.