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Google scholar citations:

<https://scholar.google.lu/citations?user=iHXGyWAAAAAJ&hl=en>

Career experience

January 2016 to present: Assistant Professor (Lecturer), Faculty of Earth Sciences, School of Engineering and Natural Sciences, University of Iceland.

January 2015 to July 2016: Post-doctoral scholar, European Center for Geodynamics and Seismology, Luxembourg. Project title “Tectono-volcanic Interaction and Ground Deformation studies using Space-geodesy (TIGRES)”, with focus on the Virunga Volcanic Province in central Africa.

August 2014 to December 2014: Post-doctoral scholar, Geosciences Department, The Pennsylvania State University.

1999-2011: Geophysicist, Division of Processing and Research, Icelandic Meteorological Office. Main duties were supervising, operating and developing the continuous GPS network in Iceland.

1997 & 1998: Summer-internship at the Icelandic National Energy Authority, Hydrological Department.

Education

2010 - 2014: PhD in Geosciences, The Pennsylvania State University. Thesis title: “Crustal deformation and volcanism at active plate boundaries”. Advisor: Peter LaFemina.

1999 - 2002: M.Sc. in Geophysics, University of Iceland. Thesis title “Continuous GPS measurements in Iceland 1999 – 2002”. Advisor: Páll Einarsson.

1996 - 1999: B.Sc. in Geophysics, University of Iceland.

Research interests

- Processes driving and affecting crustal deformation at active volcanoes and plate boundaries.
- Magma plumbing systems: nature and processes affecting delivery of magma; fluid storage, migration, segregation; cause and effects of temporary sealing of hydro-magmatic systems on explosive activity. Interactions of magma-geothermal-tectonic systems.
- Glacio-isostatic adjustments: observations, models of elastic and viscous response, effect of unloading on volcanism, stresses, and earthquake & eruptive hazards
- Crustal structure: rheological and elastic properties of the crust. Insights from crustal deformation, seismic tomography, loading and un-loading response, thermal modeling, gravity, and resistivity.

Committee work

- Organizer for a workshop on "Interaction of geothermal, tectonic, and magmatic processes in the Hengill area, SW-Iceland", Reykjavík, Iceland, September 21, 2017.
- Organizing committee for a 12-day PASI workshop on "Magma-Tectonic Interactions" in Nicaragua, 2013.
- Scientific advisory committee for the Icelandic Civil Defense, 2006-2009 & 2016-present.
- Advisory committee for hazard monitoring of the Kárahnjúkar hydroelectric power plant, 2005-2009.
- Organizing committee for the ISNET 2004 GPS measurements in Iceland.

Awards and grants

- RANNIS Infrastructure Fund, grant 171482-0031, 2017. Awarded for project "GNSS landmælingatæki til mælinga á jarðskorpuhreyfingum (GNSS geodetic instruments for measurements of crustal deformation). ISK 3.912.000.
- RANNIS grant 174377-051, 2017. Awarded for project "Interaction of geothermal, tectonic, and magmatic processes in the Hengill area, SW Iceland". ISK 55.369.000.
- Luxembourg Research Fund grant 9086153, project "Tectono-volcanic Interaction and GRound dEformation studies using Space-geodesy" (104.172 EUR).
- Hess Energy Research Award, 2014. Awarded for geodetic field work in Iceland.
- COCONet fellowship sponsored by UNAVCO, 2013. Awarded for research of tectonics and volcanism in the Caribbean. Grant extended for 2014 (2x 10.000 USD).
- Shell Geosciences Award, 2011. Awarded for investigation of geothermal utilization-induced crustal deformation using GPS and InSAR data at Telica volcano, Nicaragua.
- Barry Voight Endowment, 2010, 2012, and 2013. Awarded for GPS field work in Nicaragua and Iceland.
- Best oral presentation of pre-comprehensive exam students, Penn State Geosciences Annual Colloquium, 2012.
- RANNIS grant 81057, 2008. Instrumental fund. Awarded for "GPS geodetic instruments for measurements of glacier movements". ISK 4.103.000.
- RANNIS grant 41051, 2004. Instrumental fund. Awarded for "Tilt meters for measurements of magma movements". ISK 800.000.

Teaching and mentoring experience

Courses taught at the University of Iceland, 2016-present: General Geophysics (JED201G), Introduction to Geophysics (JED104G), Simulation of Glacial Processes (JED129F), Measurements and Models in Geodynamics (JED209F), Seminar on Current Geological Events (JED111F), Introduction to Iceland Geology (JAR106G).

September 14-25, 2015: "GNSS Training course". 12-day training course held at CERUKI, Bukavu, Democratic Republic of Congo.

October 2014: "Geodetic GPS data collection and analysis". 7-day training course held at Instituto Nicaragüense de Estudios Territoriales (INETER), Nicaragua.

2011, 2013, 2014: Teaching assistant at the Pennsylvania State University in Physical Volcanology (GEOSC 434).

2010-2014: Mentored and assisted various graduate and undergraduate students on volcanic

and tectonic projects in Peter LaFemina's lab at The Pennsylvania State University.
2013-2014: Mentored three undergraduate students from the Grand Valley State University (Michigan, US) for processing and interpretation of geodetic data from Trinidad, Tobago, and Puerto Rico.
2007, 2008: Mentored summer interns from the University of Strasburg, France. Their project was to implement tilt data for volcano monitoring and research in Iceland.
1999: Teaching assistant at the University of Iceland in Experimental Physics.

Publications

First author of 7 peer-reviewed papers, co-author of over 30 other papers. Numerous presentations at acclaimed meetings. Selected peer-reviewed publications below, see https://docs.google.com/document/d/1TZ-ZazNPI2q3kxON_xnzArdqEu_GDGMKUNu9YXRBO-E/edit?usp=sharing for a full publication list including conference materials.

- Juncu, D., Árnadóttir, T., **Geirsson**, H., Guðmundsson, G. B., Lund, B., Gunnarsson, G., Hooper, A., Hreinsdóttir, S., Michalczywska, K. (2018). Injection-induced surface deformation and seismicity at the Hellisheidi geothermal field, Iceland. *Journal of Volcanology and Geothermal Research*, in press.
- Barrière, J., d'Oreye, N., Oth, A., **Geirsson**, H., Mashagiro, N., Johnson, J., Smets, B., Samsonov, S., Kervyn, F. (2018). Single-station seismo-acoustic monitoring of Nyiragongo's lava lake activity (DR Congo). *Frontiers in Earth Science*, 6, 82, in press.
- Sigmundsson, F., Parks, M., Pedersen, R., Jónsdóttir, K., Ófeigsson, B. G., Grapenthin, R., Dumont, S., Einarsson, P., Drouin, V., Heimisson, E.R., Hjartardóttir, Á. R., Guðmundsson, M., **Geirsson**, H., Hreinsdóttir, S., Sturkell, E. (2018). Magma Movements in Volcanic Plumbing Systems and their Associated Ground Deformation and Seismic Patterns. In: Burchardt (ed.), *Volcanic and Igneous Plumbing Systems* (pp. 285-322), Elsevier.
- Samsonov, S. V., Feng, W., Peltier, A., **Geirsson**, H., d'Oreye, N., & Tiampo, K. F. (2017). Multidimensional Small Baseline Subset (MSBAS) for volcano monitoring in two dimensions: Opportunities and challenges. Case study Piton de la Fournaise volcano. *Journal of Volcanology and Geothermal Research*, 344, 121-138, doi: 10.1016/j.jvolgeores.2017.04.017.
- Geirsson**, H., N. d'Oreye, N. Mashagiro, M. Syauswa, G. Celli, B. Kadufu, B. Smets, F. Kervyn, F. (2016), Volcano-tectonic deformation in the Kivu Region, Central Africa: Results from six years of continuous GNSS observations of the Kivu Geodetic Network (KivuGNet). *Journal of African Earth Sciences*, 134, 809-823, doi: 10.1016/j.jafrearsci.2016.12.013.
- Roman, D.C., M. Rodgers, H. **Geirsson**, P.C. LaFemina, V. Tenorio (2016), Assessing the likelihood and magnitude of volcanic explosions based on seismic quiescence. *Earth and Planetary Science Letters*, 450, 20–28, doi:10.1016/j.epsl.2016.06.020.
- Islam, M. T., E. Sturkell, P. LaFemina, H. **Geirsson**, F. Sigmundsson, and H. Ólafsson (2016), Continuous subsidence in the Thingvellir rift graben, Iceland: Geodetic observations since 1967 compared to rheological models of plate spreading, *J. Geophys. Res. Solid Earth*, 121, doi:10.1002/2015JB012306.
- Geirsson**, H., LaFemina, P. C., DeMets, C., Hernandez, D. A., Mattioli, G. S., Rogers, R., Rodriguez, M., Marroquin, G., Tenorio, V. (2015). The 2012 August 27 Mw 7.3 El Salvador earthquake: expression of weak coupling on the Middle America subduction zone. *Geophysical Journal International*, 202(3), 1677–1689. doi:10.1093/gji/ggv244.
- Weber, J. C., H. **Geirsson**, J. L. Latchman, K. Shaw, P. La Femina, S. Wdowinski, M. Higgins, C. Churches, and E. Norabuena (2015), Tectonic inversion in the Caribbean-South American plate boundary: GPS Geodesy, Seismology, and Tectonics of the Mw 6.7 April 22, 1997 Tobago earthquake, *Tectonics*, 34, doi:10.1002/2014TC003665.
- Rodgers, M., Roman, D. C., **Geirsson**, H., LaFemina, P., McNutt, S. R., Munos, A., Tenorio, V. (2015), Stable and unstable phases of elevated seismic activity at the persistently restless Telica Volcano, Nicaragua, *Journal of Volcanology and Geothermal Research*, 290, 63-74, doi: 10.1016/j.jvolgeores.2014.11.012.

- Sigmundsson, F., Hooper, A., Hreinsdóttir, S., Vogfjörð, K. S., Ófeigsson, B. G., Heimisson, E. R., Dumont, S., Parks, M., Spaans, K., Gudmundsson, G. B., Drouin, V., Árnadóttir, Th., Jónsdóttir, K., Gudmundsson, M. T., Högnadóttir, Th., Fridriksdóttir, H. M., Hensch, M., Einarsson, P., Magnússon, E., Samsonov, S., Brandsdóttir, B., White, R. S., Ágústsdóttir, Th., Greenfield, T., Green, R. G., Hjartardóttir, A. R., Pedersen, R., Bennett, R. A., **Geirsson**, H., LaFemina, P. C., Björnsson, H., Pálsson, F., Sturkell, E., Bean, C. J., Mölhoff, M., Braiden, A. K., Eibl, E. P. S. (2015), Segmented lateral dyke growth in a rifting event at Bardarbunga volcanic system, Iceland. *Nature*, 517, 191–195, doi: 10.1038/nature14111.
- Hreinsdóttir, S., F. Sigmundsson, M.J. Roberts, H. Björnsson, R. Grapenthin, Th. Arason, Th. Arnadóttir, J. Holmjarn, H. **Geirsson**, R.A. Bennett, M.T. Gudmundsson, B. Oddsson, B.G. Ófeigsson, T. Villemin, Th. Jonsson, E. Sturkell, A. Hoskuldsson, G. Larsen, Th. Thordarson, B.A. Óladóttir, 2014. Volcanic plume height correlated with magma-pressure change at Grimsvotn Volcano, Iceland, *Nature Geoscience*.
- Geirsson**, H., M. Rodgers, P. LaFemina, M. Witter, D. Roman, A. Munoz, V. Tenorio, J. Alavarez, V. C. Jacobo, D. Nilsson, B. Galle, M. D. Feineman, T. Furman, A. Morales, 2014. Multidisciplinary observations of the 2011 explosive eruption of Telica volcano, Nicaragua: Implications for the dynamics of low-explosivity ash eruptions. *J. Volc. Geotherm. Res.*, 271, 1, 55-69, doi: 10.1016/j.jvolgeores.2013.11.009.
- Kobayashi, D., P. LaFemina, H. **Geirsson**, E. Chichaco, A. A. Abrego, H. Mora, and E. Camacho(2014), Kinematics of the western Caribbean: Collision of the Cocos Ridge and upper plate deformation, *Geochem. Geophys. Geosyst.*, 15, 1671–1683, doi:10.1002/2014GC005234.
- Rodgers, M., D. C. Roman, H. **Geirsson**, P. LaFemina, A. Munoz, C. Guzman, V. Tenorio, 2013. Seismicity accompanying the 1999 eruptive episode at Telica Volcano, Nicaragua. *J. Volc. Geotherm. Res.*, 265, 39-51, doi:10.1016/j.jvolgeores.2013.08.010.
- Sturkell, E., K. Ágústsson, A. T. Linde, S.I. Sacks, P. Einarsson, F. Sigmundsson, H. **Geirsson**, R. Pedersen, P. C. LaFemina, H. Ólafsson, 2013. New insights into volcanic activity from strain and other deformation data for the Hekla 2000 eruption. *J. Volc. Geotherm. Res.*, 256, 78-86, doi:10.1016/j.jvolgeores.2013.02.001.
- Geirsson**, H., P. LaFemina, T. Árnadóttir, E. Sturkell, F. Sigmundsson, M. Travis, P. Schmidt, B. Lund, S. Hreinsdóttir, and R. Bennett, 2012. Volcano deformation at active plate boundaries: Deep magma accumulation at Hekla volcano and plate boundary deformation in south Iceland. *J. Geophys. Res.*, 117, B11409, doi:10.1029/2012JB009400.
- Hooper, A., B. Ófeigsson, F. Sigmundsson, B. Lund, P. Einarsson, H. **Geirsson**, E. Sturkell, 2011. Increased capture of magma in the crust promoted by ice-cap retreat in Iceland. *Nature Geoscience*, 4, 783-786, doi:10.1038/NGEO1269.
- Metzger, S., S. Jónsson, and H. **Geirsson**, 2011. Locking depth and slip-rate of the Húsavík Flatey fault, North Iceland, derived from continuous GPS data 2006–2010. *Geophys. J. Int.*, 187, 2, 564-576, doi: 10.1111/j.1365-246X.2011.05176.x.
- Magnússon, E., H. Björnsson, H. Rott, M.J. Roberts, F. Pálsson, S. Gudmundsson, R.A. Bennett, H. Geirsson, E. Sturkell (2011). Localized uplift of Vatnajökull, Iceland: subglacial water accumulation deduced from InSAR and GPS observations. *Journal of Glaciology*, 57, 203, 475-484.
- Sigmundsson, F., S. Hreinsdóttir, A. Hooper, Th. Árnadóttir, R. Pedersen, M. Roberts, N. Óskarsson, A. Auriac, J. Decriem, P. Einarsson, H. **Geirsson**, M. Hensch, B. Ófeigsson, E. Sturkell, H. Sveinbjörnsson, K.L. Feigl, 2010. Intrusion triggering of the 2010 Eyjafjallajökull explosive eruption. *Nature*, 468, 426-430, doi:10.1038/nature09558.
- Geirsson**, H., Th. Árnadóttir, S. Hreinsdóttir, J. Decriem, P.C. LaFemina, S. Jónsson, R. A. Bennett, S. Metzger, A. Holland, E. Sturkell, T. Villemin, C. Völksen, F. Sigmundsson, P. Einarsson, M. J. Roberts, H. Sveinbjörnsson, 2010. Overview of results from continuous GPS observations in Iceland from 1995 to 2010. *Jökull*, vol. 60, p. 3-22.
- Sigmundsson, F., V. Pinel, B. Lund, F. Albino, C. Pagli, H. **Geirsson**, E. Sturkell, 2010. Climate effects on volcanism: Influence on magmatic systems of loading and unloading from ice mass variations with examples from Iceland, *Phil. Trans. Roy. Soc. A, Special issue on climate forcing of geological and geomorphological hazards*, *Philosophical Transactions Royal Society A* (2010) 368, 1-16, doi:10.1098/rsta.2010.0042
- Decriem, J., Th. Árnadóttir, A. Hooper, H. **Geirsson**, M. Keiding, B.G. Ófeigsson, F. Sigmundsson, S. Hreinsdóttir, P. LaFemina and R. Bennett, 2010. The 29 May 2008 earthquake doublet in SW Iceland, *Geophys. J. Int.*, 181(2), 1128-1146, doi: 10.1111/j.1365-246X.2010.04565.x

- Sturkell, E., P. Einarsson, F. Sigmundsson, A. Hooper, B.G. Ofeigsson, H. **Geirsson** and H. Olafsson 2010. Katla and Eyjafjallajökull Volcanoes. In: Developments in Quaternary Science, eds. A. Schomacker, J. Kruger and K.H. Kjaer, Elsevier, Volume 13, The Myrdalsjökull Ice Cap, Iceland. Glacial processes, sediments and landforms on an active volcano, 5-21, doi:10.1016/S1571-0866(09)01302-5.
- Geirsson**, H., Jakobsdóttir, S.S., Guðmundsson, G.B., Roberts, M.J., Decriem, J., 2009. A deep seated magmatic intrusion at Upptyppingar, Iceland, during 2007 and 2008 In: The VOLUME Project, VOLcanoes: Understanding subsurface mass moveMEnt, ed. C.J. Bean, A.K. Braiden, I. Lokmer, F. Martini, G.S. O'Brien. School of Geological Sciences, University College Dublin, Belfield, Dublin 4, Ireland.
- Pinel, V., F. Albino, Freysteinn Sigmundsson, Erik Sturkell, Halldór Geirsson, Páll Einarsson & Magnús Tumi Guðmundsson (2009). Consequences of local surface load variations for volcano monitoring: Application to Katla subglacial volcano, Iceland. Í: C. J. Bean, A. K. Braiden, I. Lokmer, F. Martini, G. S. O'Brien (ritstj.): The VOLUME Proect, VOLcanoes: Understanding subsurface mass moveMEnt. School of Geological Sciences, University College Dublin, Belfield.
- Árnadóttir, Th., B. Lund, W. Jiang, and H. **Geirsson**, H. Björnsson, P. Einarsson and T. Sigurdsson, 2009. Glacial rebound and plate spreading: Results from the first countrywide GPS observations in Iceland, *Geophys. J. Int.*, 177(2), 691-716, doi: 10.1111/j.1365-246X.2008.04059.x.
- Hreinsdóttir, S., T. Árnadóttir, J. Decriem, H. Geirsson, A. Tryggvason, R. A. Bennett, and P. LaFemina, 2009. A complex earthquake sequence captured by the continuous GPS network in SW Iceland, *Geophys. Res. Lett.*, 36, L12309, doi:10.1029/2009GL038391.
- Sturkell, E., P. Einarsson, H. **Geirsson**, E. Tryggvason, J.G. Moore, and R. Ólafsdóttir, 2009. Precision levelling and geodetic GPS observations performed on Surtsey between 1967 and 2002, *Surtsey Research*, 12, 39-47.
- Volkens, C., Th. Arnadóttir, H. Geirsson, G. Valsson (2009), Present day geodynamics in Iceland monitored by a permanent network of continuous GPS stations, *Journal of Geodynamics*, 48, 279-283, doi: 10.1016/j.jog.2009.09.033.
- Sturkell, E., F. Sigmundsson, H. **Geirsson**, H., Ólafsson, Th. Theodórsson, 2008. Multiple volcano deformation sources in a post-rifting period: 1989–2005 behaviour of Krafla, Iceland constrained by levelling, tilt and GPS observations. *J. Volc. Geotherm. Res.*, 177, 405–417, doi:10.1016/j.jvolgeores.2008.06.013.
- Sturkell, E., Einarsson, P., Roberts, M.J., **Geirsson**, H., Gudmundsson, M.T., Sigmundsson, F., Pinel, V., Guðmundsson, G.B., Ólafsson, H., & Stefánsson, R., 2008. Seismic and geodetic insights into magma accumulation at Katla subglacial volcano, Iceland: 1999 to 2005. *Journal of Geophysical Research*, 113, B03212, doi:10.1029/2006JB004851
- Jakobsdóttir, S.S., M.J. Roberts, G.B. Gudmundsson, H. **Geirsson**, R. Slunga, 2008. Earthquake swarms at Upptyppingar, North-East Iceland: A sign of magma intrusion? *Stud. Geophys. Geod.*, 52, 513-528, doi: 10.1007/s11200-008-0035-x.
- Keiding, M., Árnadóttir, Th., Sturkell, E., & Geirsson, H., 2008: Contemporary strain accumulation along the Reykjanes Peninsula, South Iceland, *Geophysical Journal International*, 172, 861–872 doi: 10.1111/j.1365-246X.2007.03655.x
- Árnadóttir, Th. H. Geirsson, W. Jiang (2008). Crustal deformation in Iceland: Plate spreading and earthquake deformation. *Jökull*, 58, 59-74.
- Paglí, C., Sigmundsson, F., Lund, B., Sturkell, E., Geirsson, H., Einarsson, P., & Árnadóttir, T., 2007: Glacio-isostatic deformation around the Vatnajökull ice cap, Iceland, induced by recent climate warming: GPS observations and Finite Element Modeling, *Journal of Geophysical Research*, Vol. 112, No. B8, B08405, DOI: 10.1029/2006JB004421.
- Pinel, V., Sigmundsson, F., Sturkell, E., Geirsson, H., Einarsson, P., Gudmundsson, M.T. & Högnadóttir, T., 2007: Green's function estimates of Earth response to variable surface loads: Application to deformation of the subglacial Katla volcano, Iceland, *Geophysical Journal International*, 169, 325–338, doi: 10.1111/j.1365-246X.2006.03267.x
- Geirsson**, H., Th. Árnadóttir, C. Völkens, W. Jiang, E. Sturkell, T. Villemin, P. Einarsson, F. Sigmundsson, R. Stefánsson, 2006. Current plate movements across the Mid-Atlantic Ridge determined from 5 years of continuous GPS measurements in Iceland, *J. Geophys. Res.*, 111, B9, B09407, doi: 10.1029/2005JB004092.

- Sturkell, E., P. Einarsson, F. Sigmundsson, H. **Geirsson**, H. Ólafsson, R. Pedersen, E. de Zeeuw-van Dalssen, A. L. Linde, I. S. Sacks, and R. Stefánsson, 2006. Volcano geodesy and magma dynamics in Iceland, *J. Volc. Geotherm. Res.*, 150, 14-34.
- Arnadóttir, Th., Jiang, W., Feigl, K.L., Geirsson, H. & Sturkell, E., 2006: Kinematic models of plate boundary deformation in southwest Iceland derived from GPS observations. *Journal of Geophysical Research*. 111, B07402, doi:10.1029/2005JB003907.
- Grapenthin, R., F. Sigmundsson, H. **Geirsson**, Þ. Árnadóttir, V. Pinel, 2006. Icelandic rhythmicity: Annual modulation of land elevation and plate spreading by snow load. *Geophysical Research Letters*, 33(24), L24305, doi: 10.1029/2006GL028081.
- Vogfjörð, K. S., S. S. Jakobsdóttir, G. B. Guðmundsson, M. J. Roberts, K. Ágústsson, Þ. Arason, H. **Geirsson**, S. Karlsdóttir, S. Hjaltadóttir, U. Ólafsdóttir, B. S. Þorbjarnardóttir, Þ. Skaftadóttir, E. Sturkell, E. B. Jónasdóttir, G. Hafsteinsson, H. Sveinbjörnsson, R. Stefánsson, Þ. V. Jónsson, 2005. Forecasting and monitoring a subglacial eruption in Iceland. *EOS transactions*, 86(26), 245, 248.
- Hjaltadóttir, S., H. Geirsson, Th. Skaftadóttir, 2005. Seismic activity in Iceland during 2004. *Jokull*, 55, 107-119.
- Arnadóttir, Th., H. Geirsson, P. Einarsson, 2004. Coseismic stress changes and crustal deformation on the Reykjanes Peninsula due to triggered earthquakes on 17 June 2000. *J. Geophys. Res.*, 109, B09307, doi: 10.1029/2004JB003130.
- Sturkell, E., P. Einarsson, F. Sigmundsson, S. Hreinsdóttir, H. **Geirsson**, 2003. Deformation of Grímsvötn volcano, Iceland: 1998 eruption and subsequent inflation. *Geophysical Research Letters*, 30,4, 1182, doi:10.1029/2002GL016460.
- Sturkell, E., Páll Einarsson, Freysteinn Sigmundsson, Halldór Geirsson, Halldór Ólafsson, Rósa Ólafsdóttir & Gunnar B. Guðmundsson 2003. Þrýstingur vex undir Kötlu. *Náttúrufræðingurinn* 71(3-4), 80-86.