Prof. Dr. Virginia Gail Toy

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1. Academic qualifications

2008	PhD (Geology), University of Otago
2006	MPhil (Earth Sciences), Australian National University
2001	MSc (Hons, Geology), University of Auckland
1999	BSc (Geology), University of Auckland

2. Professional positions held

Oct 2019 – present	W2 Professorin für Strukturgeologie und Tektonik, Universität Mainz, Germany; Honorary Research Associate Professor, Universities of Otago and Auckland, NZ;
Dec 2018-Sept 2019	Associate Dean – International, Division of Sciences, University of Otago, NZ.
Feb 2018-Sept 2019	Research Associate Professor, University of Otago, NZ.
Feb 2013-Jan 2018	Senior Lecturer, University of Otago, NZ ('above the bar' since February 2017)
June-Sept 2017	Specially Appointed Associate Professor, Hokkaido University, Japan
Aug-Oct 2016	Visiting Professor, Yachay Tech University, Urcuquí, Ecuador
Jan 2009-Jan 2013	Lecturer, University of Otago; confirmed (ie. tenured) Sept 2011.
Aug-Dec 2008	Postdoctoral Researcher, U. Wisconsin-Madison and Texas A&M University, USA.
Jan-July 2008	Lecturer, University of Otago, NZ.
2005-2007	Teaching Assistant, University of Otago, NZ.
2003	Teaching Assistant, Monash University, Australia
2001-2002	Engineering Geologist, Fraser Thomas Ltd., Auckland, NZ.
1999-2000	Research Assistant, Engineering Geology Ltd., Auckland, NZ.

3. Research/professional speciality

Structural geology and tectonics*:* I study localisation in faults and shear zones throughout Earth's lithosphere; rheology of geological materials; SW Pacific tectonic plate motions; paleoseismology and landscape evolution, and geo-resource sustainability. ***Methods****:* I make field observations, undertake microtextural analysis, particularly by electron beam, and synchrotron methods, perform deformation experiments, and validate results by computational models. I lead and participate in continental and oceanic scientific drilling projects, and co-ordinate drilling consortia membership and scientific directions.

4. Awards, professional distinctions, and professional development

2019	Assessed as an A-grade researcher in the 2013-2018 New Zealand Performance-Based Research Funding quality evaluation (PBRF).
2017-2021	Rutherford Discovery Fellowship, New Zealand [*These prestigious fellowships are designed to support the development of future research leaders; Information on the RSNZ website*]
2015	Invited speaker, Japan Top Collaboration Program, Hokkaido University
2013	Invited participant in International Continental Scientific Drilling Program (ICDP)'s Science Conference 'Imaging the Past to Imagine Our Future', Potsdam, Germany, Nov 11-14
2013	University of Otago Early Career Award for Distinction in Research
2013	Assessed as a B-grade researcher in the 2007-2012 NZ PBRF quality evaluation.
2012	Invited speaker – Gordon Research Conference on Rock Deformation, New Hampshire, USA.
2012	Structural geologist in the Science Party for Integrated Ocean Drilling Program (IODP) Expedition 343 'Japan Trench Fast Drilling Project, JFAST".
2011, 2015	Invited speaker – American Geophysical Union Fall Meeting.
2010	Toy et al. (2008) was one the 50 most-cited papers in J. Struct. Geol. from 2005-2010. By 2012, it was one of the 3 most-cited papers published in the preceding 5 years.
2010	Invited speaker – Symposium on Lithospheric Deformation, Ruhr-Universität Bochum
2010	Participant, ICDP training course at Windischeschenbach, Germany
2008	Exceptional PhD Thesis, University of Otago
2007	Attended NSF-sponsored ISeS Summer School in Rheology of Earth Materials, Colorado USA

2005	American Geophysical Union Travel Award
2004-2007	University of Otago Postgraduate Scholarship
2003	Australian National University and Monash University Graduate Scholarships
2001	Senior Scholar in Geology and Bartrum Memorial Prize in Geology (Honours)
2000	Geological Society of New Zealand Student Research Award

5. Contributions to the research environment

2020-	Editor for the *Journal of Structural Geology*, Topical Editor for the journal *Solid Earth*
2018	University of Otago Performance-Based Research Fund (PBRF) review panel
2018-	International Continental Scientific Drilling Project Science Advisory Group (SAG)
2018	Convenor of session at EGU General Assembly, Vienna, Austria.
2017-2018	Guest Associate Editor for the journal *Tectonics*
2016	UNESCO Int. Geosci. Program Scientific Board, *Geol. Soc. Lond. Books* Advisory Committee
2014-2018	Editorial Advisory Board, *Journal of Structural Geology*
2014-2018	Science Committee for Australia - New Zealand IODP Consortium
2015-2016	Geol. Soc. America International Speakers Advisory Committee
2013	Steering committee, NSF Workshop in Utah to plan US Scientific Drilling "post-SAFOD"
2012	Member of DrillNZ and ANZIC Committees
2010-2015	Convenor of sessions at the American Geophysical Union Fall Meeting, San Francisco, USA.
2012-2013	Editor, *Journal of Structural Geology* Special Issue on Continental Fault Zones.
2011	Organising committee, "Alpine Fault Symposium", University of Otago.
2011-2018	External examiner for 3 PhD theses (Otago) + 2 MSc theses (Victoria).
2000-2016	Member, Geological (now Geoscience) Society of New Zealand
2005-2016	Member, American Geophysical Union; NZ Federation Graduate Women
2009-2010	Editor, *Geol. Soc. Lond. Special Publication:* Geology of the Earthquake Source.
2009	Conference and session convenor, field trip leader, NZ Geol. & Geophys. Soc. conference.
2009	Organising committee for ICDP Workshop, Franz Josef Glacier.
2007-	Principal Investigator; Alpine Fault – Deep Fault Drilling Project
2006-2013	Reviewer; Geology, Earth Planet. Sci. Lett., Earthquake Science, Geosphere, G^3, Geol. Soc. Lond. – Spec. Pub., Geophys. Res. Lett., Nature, NZ J. Geol. Geophys., Science Reports, Tectonics, Tectonophys., Journals of: Struct. Geol., Petrology, Vulc. & Geoth. Res., ANSTO, Catalyst Fund (NZ), Royal Society (Lond.), NSF(USA), NSERC Canada.

Current supervision or co-supervision: 3 postdoctoral scholars; 1 PhD; 1 MSc, 2 BSc.
Supervision or co-supervisions completed: 4 postdoctoral scholars; 14 PhD; 11 MSc; 8 BSc(Hons); 3 Interns

6. Selected Examples of Outreach Activities

I regularly provide informed scientific expertise and commentary, e.g. for a Wind Farm consent hearing (2016), the Franz Josef Fault Avoidance Zone (2018-2020), and discussions of a ban on fracking (2012)
Contributor to Schulebuch "Seydlitz Erdkunde Rheinland-Pfalz", 2020.
I have hosted RSNZ Primary Teacher Fellows, e.g. Ruth Baldwin (Balclutha Primary), 2012.
Organising committee member (2009-2017) and project leader (2006-2018) for Hands on at Otago.
Regular public lectures to community groups, e.g. Wanaka University of the 3rd Age, 10 Mar 2017.
Cast in a documentary TV series (Beneath New Zealand) and a popular science book (Terrain)
I star in blog posts and youtube movies designed to communicate research initiatives in accessible forms.

7. Research Grants and Funding Awarded

Since award of my PhD in 2008 I have administered ~€1.8Million research funds as Principal Investigator and ~€3.3Million as Associate Investigator.

7a. *Research Grants where I am the first named principal or joint principal investigator (ie. PI).*

2020-2021	Rhein-Main Universität (RMU) Alliance Initiativfonds Lehre 2020 for „Digital regional geologie der RMU", 34,960 €
2020-2021	Universität Mainz Inneruniversitart ForschungsInitiativ (Stufe I) funding for "Do active faults' clay mineral compositions affect whether earthquake ruptures they host will displace the surface?" 26,000 €.
2020	TeMaS Grants from University of Mainz / Forschungsinitiative Rheinland-Pfalz for "Fluids, melts, and fractures in the lower crust". 8,800 €

2019	TeMaS Grants from University of Mainz / Forschungsinitiative Rheinland-Pfalz for "Dual porosity system (pore and fracture) permeability in volcanic tuffs by computed tomography" and "Bulk seismic properties of mantle wedge peridotites". 10,200 €
2018	Awarded 9 shifts of beamtime on Spring8 synchrotron, Japan, beamline BL20XU, for Proposal No. 2018A1506 "Where in the Earth's crust do nanopores develop in fault zone and shear zone rocks, and what is their impact on the mechanical behavior and electrical properties of these zones?" Equivalent value for proprietary use ~NZ$60,000.
2018, 2019	Funding to visit and work at Université Grenoble-Alpes under the INVITATIONS d'enseignants-chercheurs – Campagnes. ~9500 €.
2017	Awarded 6 shifts of beamtime on Spring8 synchrotron, Japan, beamline BL20XU, for Proposal No. 2017B1387 "How does particle arrangement in Fault Rocks affect the earthquakes they generate?". Equivalent value for proprietary use ~NZ$40,000.
2017-2021	Rutherford Discovery Fellowship (16-UOO-001) "Weaving Earth's Weak Seams: Manifestations and mechanical consequences of rock fabric development in active faults and shear zones". NZ$800,000+GST.
2017-2021	Subcontract to GNS Science (GNS-MBIE00056) as part of the "Hikurangi subduction earthquakes and slip behaviour" MBIE Endeavour Funded Project. Total project funding $6.5M, this subcontract is for $133,510+GST.
2017	University of Otago Research Grant "How do structural networks in rock influence fluid transport and storage?". NZ$14,929.
2016	University of Otago Research Grant "The role of slippery nanopowders in earthquake-generating megathrust faults". NZ$30,377.
2016	Dumont d'Urville NZ-France Technology Support grant. NZ$15,440+GST.
2014/2015	Awarded NZ$81,201+GST by NZ Ministry of Business, Innovation & Employment, contract UOOX1413 to support the Alpine Fault, Deep Fault Drilling Project (DFDP-2).
2013	Awarded 6 shifts of beamtime on the Australian Synchrotron XFM beamline for AS133/XFM/ 7160 "Raising the TitaniQ: Quantifying the effects of recrystallization on the Titanium in Quartz thermometer" – equivalent to NZ$36,000.
2012-	ICDP (International Continental Scientific Drilling Program) Full Proposal 01-2011, US$1,350,000 – "Deep Fault Drilling Project (DFDP), Alpine Fault, New Zealand: Phase 2 – conditions at 1.5 km depth."
2012	Principal Investigator for IODP (International Ocean Discovery Program) Expedition 343 – JFAST - post-cruise research grant. NZ$21,316.
2012-2014	Subcontract to GNS Science 'Tectonics of Zelandia' program for Southern NZ Active Tectonics research, $50,000/a.
2011	DAAD (German Academic Exchange Service) Visiting Scholar Award to visit Ruhr-Universität Bochum, Germany, in June/July 2011, 2,815 EUR - "Role of dislocation processes in frictional behaviour of faults".
2011	Royal Society of New Zealand International Mobility Fund award supporting travel to Ruhr-Universität Bochum and reciprocal visit to NZ by Dr. Tom Mitchell, $6,500 – "Investigation of the role of dislocations in co-seismic slip hardening of faults".
2010-2011	FRST Subcontract to GNS Science, $12,000 – "Precise mapping of near-field fault deformation in New Zealand using LiDAR technology".
2010-2012	Principal Investigator on Marsden Fast Start Grant, $300,000 – "Effect of fluids on the strength of the mid-crustal coupling zone on major faults: insights from New Zealand's Alpine Fault".
2009	Principal Investigator on University of Otago Research Grant, $30,373 - "Mantle rheology in tectonically mobile back-arc regions".

7b. ***Research Grants on which I am a named contributor (ie. AI).***

2018 Associate Investigator (to PhD Student Katrina Sauer) for award of 6 shifts of beamtime on the Australian Synchrotron IRM beamline for AS182/IRM/13433 "Do fluids cause deformation localisation in New Zealand's continental plate boundary fault zone?" – equivalent to AU$98,352.

2016 Associate Investigator (to PhD Student Martina Kirilova) for award of 6 shifts of beamtime on the Australian Synchrotron IRM beamline for AS proposal #11777 "Identifying the source of graphite in the New Zealand`s Alpine Fault rocks" – equivalent to NZ$36,000.

2016 Associate Investigator (to PhD Student Risa Matsumura): Beamtime on KOWARI neutron scattering instrument at ANSTO Lucas Heights facility, Sydney. AU56,800– "Texture measurements of sheared rocks from Plate Boundary fault zones in New Zealand and Japan".

2016 Associate Investigator (to PhD Student Risa Matsumura): Beamtime on KOWARI neutron scattering instrument at ANSTO Lucas Heights facility, Sydney. AU28,400 – "Measurement of residual stresses in fault rocks formed during earthquake-generating shear"

2016 Associate Investigator (to PhD Student Jack Williams) for award of 5 days beamtime on the Australian Nuclear and Sciences Technology Organisation (ANSTO) DINGO beamline for proposal 4691 "Imaging the damage zone surrounding New Zealand's Alpine Fault using Neutron Tomography" – equivalent to $38,000 NZD

2015-2016 Named participating researcher in Japan Society for Promotion of Science / Royal Society of New Zealand Joint Research Project Program, JSP-VUW1402-JR to Dr. J. Townened and Dr. N. Shigematsu, NZ60,000 – "Micro- to macro-scale geomechanical characterization of the seismogenic Alpine Fault".

2015-2016 Named 'Co-operation Partner' on joint Deutsch Forschungsgemeinschaft (DFG)/ICDP grant Ja 573/8-1 to Dr. C. Janssen and Prof. Dr. G. Dresen, EU127,300 – "Störungsbezogene Deformation in aktiven Verwerfungen - mikrostrukturelle, mineralogische und geochemische Untersuchungen an Bohrkernen von internationalen Bohrprojekten" ["Faulting processes in seismogenic active faults – Microstructural, mineralogical and geochemical characterization of drill core samples from several international drilling projects"].

2014-2015 International Partner Investigator on Australia-New Zealand International Ocean Discovery Program Consortium (ANZIC) Special Funding for Australians for analytical work on Ocean Drilling material to Dr. K. Gessner, Dr. N. Timms, Dr. V. Toy, Prof. J.C. White, AU$28,000 – "Searching for slippery nano-powders in earthquake-generating megathrust faults".

2014-2016 Associate investigator on Marsden Fast Start Grant UOA1414 to Dr. L. Adam, NZ$300,000 – "Getting inside the earthquake machine: fine-scale imaging of the Alpine Fault zone".

2014-2015 Supervisor of MSc Student Genevieve Coffey, who was supported by Earthquake Commission (EQC) Student Fund project no. 14/U681 "Investigating the timing and intensity of seismic activity on the Southern Alpine Fault using soft-sediment deformation and geomorphic expressions of neo-tectonics. NZ$25,000.

2014-2017 International Partner Investigator on NERC Grants NE/J024449/1 to Prof. D. Faulkner, Dr. E. Mariani, University of Liverpool, GBP 538.445 and NE/J022128/1 to Prof. D. Teagle, Dr. A. Milton, Dr. N. Woodman, University of Southampton, GBP 357,725 – "Evolution of the physical, geochemical and mechanical properties of the Alpine Fault Zone: A journey through an active plate boundary".

2013 Associate investigator; University of Otago Research Grant to Prof. P. Denys, Dr. V. Toy, Dr. C. Moy, Prof. R. Norris, Dr. C. Pearson, Dr. L. Wallace, Dr. M. Stirling "Southern Alpine Fault paleoseismic investigations". NZ$18,700.

2012-2014 Associate Investigator; Marsden Grant to Prof. D. Prior, Dr V. Toy, A. Prof. P. Langhorne, A. Prof. S. Fitzsimons, Prof. T. Little, Dr. P. Upton, Prof. G. Hirth, A. Prof. D. Goldsby, Prof. W. Durham, A. Prof. M. Holness. $915,000 – "Episodic creep at the brittle-ductile transition during the seismic cycle of great earthquakes".

2012 Associate Investigator on APS General User Proposal GUP-26026 to Assoc. Prof. K. Gessner, Dr. V. Toy, Dr. C. Delle Piane, Dr. I. Zibra , AU$11,000 travel and 9 shifts (~NZ$81,000) at

beamline 2BM-B at Advanced Photon Source/synchrotron, Chicago – "Three-dimensional characterization of brittle fault rocks".

2011-2013 International partner / Associate Investigator on US National Science Foundation grant NSF-1050041 to Prof. B. Tikoff, A. Prof. J. Newman, Dr. S. Kruckenberg, US$492,598 – "Effect of structural and compositional heterogeneity on upper mantle deformation and rheology".

2011-2015 Associate Investigator on Marsden Grant GNS1002 to Dr. R. Sutherland and Dr. J. Townend, $920,000 – " Deep Fault Drilling Project: Physical properties and ambient conditions within the active Alpine Fault plate boundary in central South Island, New Zealand".

2010-2011 International partner on Deutsche Forschungsgemeinschaft (DFG) Grant to Prof. Dr. A. Kopf and Prof. D. R. Oberhänsli, €49,800 – "ALFAD: Continental drilling through the shallow Alpine Fault, New Zealand."

2010-2011 International partner on National Environment Research Council (NERC) Grant to Prof. D. Prior, Dr. R. Mariani and Dr. D. Faulkner, UK£101,227.16 – "The evolution of deformation mechanisms, physical conditions and physical properties in the seismogenic Alpine Fault zone: a pilot study."

2010-2011 International partner on University of Western Australia Research Collaboration Award to Assoc. Prof. K. Gessner, AU$7,500 – "The active Alpine Fault zone as an analogy for fluid dynamics in Archean mineral systems."

2010 Associate Investigator on University of Otago Research Grant to Prof. R.J. Norris, $50,881 – "How the earthquake rupturing process is captured by the debris left behind."

2005 Participant in University of Otago Research Grant to Prof. R.J. Norris, $12,020 – "Deformation processes within the deep crustal part of the Alpine Fault."

8. Publications

*Note that * denotes a supervised student as first author, ** denotes a mentored postdoctoral scholar.*

In my research field, it is usual for the author who takes primary responsibility for preparation of the manuscript, contributions by all authors, and for submission and review, to be listed as the first author. Other authors generally made lesser contributions to the research; the order in which they are listed usually reflects their relative contribution; if this is equal between a number of co-authors they are listed alphabetically by surname.

In summary, since 2008 I have published from 4 to 11 manuscripts per year, and a total of 70 research articles – 14 as lead author – in scientific journals and monographs with ISI Web of Science Impact Factors (IF) in the top 25% of Geosciences (e.g. G-cubed IF = 3.5; Nature, IF = 43.8; Science IF = 38.0).

The quality of my published research is demonstrated by my citation records. On 1 Dec 2020, my h-index was 25 via ISI Web of Science and 31 via Google Scholar. Additionally, Google Scholar calculates an i10 index of 52, and indicates there have been 3014 total citations of my published works, of which 2219 are since 2015.

A full list of publications can be found at https://www.geowiss.uni-mainz.de/publikationen-virginia-toy/

8a. Books and Journal Special Issues Edited (n = 3; first author n = 2)

1. Toy, V.G., Manataschal, G., Rosenbaum, G., Miller, M., Carosi, R. (eds). Special Issue on "Orogenic Cycles: from field observations to global geodynamics". *Tectonics* 37 (2019).
2. Toy, V., Scott, J. M., Prior, D. J., (eds). Special Issue on "Continental Transform Faults", *Journal of Structural Geology* 64 (2014).
3. Fagereng, A., Toy, V.G., Rowland, J. (eds). Geology of the Earthquake Source: a volume in honour of Rick Sibson. *Geological Society of London Special Publications* 359 (2011).

8b. Book Chapters (n = 7; first author n = 3)

1. Fagereng, A., Toy, V. Fluid-Pressure Effects on Deformation: Analysis of the Lusi Mud Volcano. Ch 5 of "Problems and Solutions in Structural Geology and Tectonics". *Developments in Structural Geology and Tectonics* 5, doi: 10.1016/B978-0-12-814048-2.00005-3 (in press).

2. *Kirilova, M., Toy, V., Timms, N., Halfpenny, A., Menzies, C., Craw, D., Beyssac, O., Sutherland, R., Townend, J., Boulton, C., Carpenter, B., Cooper, A., Grieve, J., Little, T., Morales, L., Morgan, C., Mori, H., Sauer, K., Schleicher, A., Williams, J., Craw, L. Textural changes of graphitic carbon by tectonic and hydrothermal processes in an active plate boundary fault zone, Alpine Fault, New Zealand. In Gessner, K., Blenkinsop, T.G., Sorjonen-Ward, P., (eds), *Geological Society, London, Special Publication* 453 'Advances in the Characterization of Ore-Forming Systems From Geological, Geochemical and Geophysical data'. doi: 10.1144/SP453.13 (2018).

3. Toy, V.G.. The Japan Trench Rapid Drilling Project (JFAST) yields new insights into the mechanics and structure of subduction thrust faults: IODP Expeditions 343 and 343T. In: Exon, N. (Ed): Exploring the Earth under the sea: Australian and New Zealand achievements in the first phase of IODP scientific ocean drilling, 2006-2013. *Australian National University Press,* pp. 116-121, doi: 10.22459/EEUS.10.2017 (2017).

4. Toy, V.G., Ritchie, S., Sibson, R.H., Diverse habitats of pseudotachylytes in the Alpine Fault zone and relationships to current seismicity. In: Fagereng, A., Toy, V.G., Rowland, J. (eds) Geology of the Earthquake Source: a volume in honour of Rick Sibson. *Geological Society of London Special Publications* 359, pp. 115-134 (2011).

5. Fagereng, A., Toy, V.G., Geology of the earthquake source – an introduction. In: Fagereng, A., Toy, V.G., Rowland, J. (eds) Geology of the Earthquake Source: a volume in honour of Rick Sibson*. Geological Society of London Special Publications* 359, pp. 1-16 (2011).

6. *Dempsey, E., Prior, D., Mariani, E., Toy, V.G., Tatham, D., Mica controlled anisotropy within mid to upper crustal mylonites: an EBSD study of mica fabrics in the Alpine Fault Zone, New Zealand. In: Prior, D., etc (eds) Deformation Mechanisms, Rheology and Tectonics: Microstructures, Mechanics & Anisotropy. *Geological Society of London Special Publications* 360, pp. 33-48 (2011).

7. Sibson, R.H. and Toy, V.G., The habitat of fault-generated pseudotachylyte: Presence vs. absence of friction melt. In: McGarr, A., Abercrombie, R., Di Toro, G. (eds) Earthquakes: Radiated Energy and the Physics of Faulting. *AGU Geophysical Monograph* 170, pp. 153-166 (2007).

8c. Refereed Journal Articles (n = 63; first author n = 11)

1. *Montheil, L., **Toy, V.G.,** Scott, J.M., Mitchell, T.M., Dobson, D.P. Impact of coseismic frictional melting on particle size, shape distribution and chemistry of experimentally-generated pseudotachylite. *Frontiers in Earth Science*, in press (2020)

2. *Cappuccio, F., **Toy, V.,** Mills, S., Adam, L. Three-dimensional separation and characterization of fractures in X-ray computed tomographic images of rocks*. Frontiers in Earth Science*, in press (2020)

3. **Kirilova, M., **Toy, V.,** Sauer, K., Renard, F., Gessner, K., Wirth, R., and Xiao, X.: Micro- and nano-porosity of the active Alpine Fault zone, New Zealand, Solid Earth, https://doi.org/10.5194/se-2020-90, in press (2020)

4. Adam, L., Frehner, M., Sauer, K., **Toy, V.G.,** Guerin-Marthe, S. Seismic anisotropy and its impact on imaging the shallow Alpine Fault: an experimental and modeling perspective. *Journal of Geophysical Research, Solid Earth*, doi: 10.1029/2019JB19029. (**in press**)

5. *Cappuccio, F., **Toy, V.G.,** Mills, S., Adam, L. Three-dimensional separation and characterization of fractures in X-ray computed tomographic images of rocks. Frontiers in Earth Science (**in press**).

6. Schuck, B. Schleicher, A.M., Janssen, C., Toy, V.G.,, Dresen, G. 2020. Fault zone architecture of a large plate-bounding strike-slip fault: a case study from the Alpine Fault, New Zealand. *Solid Earth*, 11, 95-124, doi: 10.5194/se-11-95-2020.

7. Abdulsamad, F., Revil, A., Ghorbani, A., Toy, V., Kirilova, M., Coperey, A., Duvillard, P.A., Ménard, G., Ravanel, L. in review. Complex conductivity of graphitic schists and sandstones. *Journal of Geophysial Research, Solid Earth.* 124(8), 8223-8249. doi: 10.1029/2019JB017628. (2019).

8. Toy, V.G., Manataschal, G., Rosenbaum, G., Miller, M., Carosi, R. Introduction to "Orogenic Cycles: from field observations to global geodynamics. *Tectonics*, doi: 10.1029/2018TC005376. (2019).

9. **Kidder, S., Toy, V.G., Prior, D.J., Little, T.A., Macrae, C. Constraints on Alpine Fault (New Zealand) Mylonitization Temperatures and Geothermal Gradient from Ti-in-quartz Thermobarometry. *Solid Earth.* doi: 10.5194/se-9-1123-2018. (2018).

10. *Kirilova, M., Toy, V.G., Rooney, J.S., Giorgetti, C., Gordon, K.C., Collettini, C., Takeshita, T. Structural disorder of graphite and implications for graphite thermometry. *Solid Earth,* 9, 1-9, doi: 10.5194/se-9-1-2018. (2018).

11. Litchfield, N.J., Villamor, P., Van Dissen, R.J., Nicol, A., Barnes, P.M., Barrell, D.J.A., Pettinga, J.R., Langridge, R.M., Little, T.A., Mountjoy, J.J., Ries, W.F., Rowland J., Fenton, C., Stirling, M.W., Kearse, J., Berryman, K.R., Cochran, U.A., Clark, K.J., Hemphill-Haley, M., Khajavi, N., Jones, K.E., Archibald, G., Upton, P., Asher, C., Benson, A., Cox, S.C., Gasston, C., Hale, D., Hall, B., Hatem, A.E., Heron, D.W., Howarth, J., Kane, T.J., Lamarche, G., Lawson, S., Lukovic, B., McColl, S.T., Madugo, C., Manousakis, J., Noble, D., Pedley, K., Sauer, K., Stahl, T., Strong, D.T., Townsend, D.B., Toy, V., Williams, J., Woelz, S., Zinke, R., Surface Rupture of Multiple Crustal Faults in the Mw 7.8 2016 Kaikōura Earthquake, New Zealand. *Bulletin of the Seismological Society of America* 108(3B), 1946-1520. doi: 10.1785/0120170300 (2018).

12. Massiot, C., Célérier, B., Doan, M.-L., Little, T.A., Townend, J., McNamara, D.D., Williams, J., Schmid, D.R., Toy, V.G., Sutherland, R., Janku-Capova, L., Upton, P., Pezard, P.A. The Alpine Fault hangingwall viewed from within: structural analysis of ultrasonic image logs in the DFDP-2B borehole, New Zealand. *Geochemistry, Geophysics, Geosystems.* doi: 10.1002/ 2017GC007368 (2018).

13. *Schuck, B., Janssen, C., Schleicher, A.M., Toy, V.G., Dresen, G. Microstructures imply cataclasis and authigenic mineral formation control geomechanical properties of New Zealand's Alpine Fault. *Journal of Structural Geology,* 110, 172-186, doi: 10.1016/j.jsg.2018.03.001. (2018) [IF = 3.1, citations = 0].

14. *Boulton, C., Menzies, C.D., Toy, V., Townend, J., Sutherland, R. Geochemical and microstructural evidence for interseismic changes in fault zone permeability and strength, Alpine Fault, New Zealand. *Geochemistry, Geophysics, Geosystems* 18(1), 238-265 doi: 10.1002/2016GC006588. (2017). [IF = 3.4, citations = 10].

15. *Boulton, C., Yao, L., Faulkner, D.R., Townend, J., Toy, V.G., Ma, S., Shimamoto, T. High-velocity frictional properties of Alpine Fault rocks: Mechanical data, microstructural analysis, and implications for rupture propagation. *Journal of Structural Geology* 97, 71-92, doi: 10.1016/j.jsg.2017.02.003 (2017).

16. Chamberlain, C.J., Boese, C.M., Eccles, J.D., Savage, M.K., Baratin, L.-M., Towend, J., Geology, A.K., Jacobs, K.M., Benson, A., Taylor-Offord, S., Thurber, C., Guo, B., Okada, T., Takagi, R., Yoshida, K., Sutherland, R., Toy, V.G., Real time earthquake monitoring at the Deep Fault Drilling Project. *Seismological Research Letters*, 88(6), 1443-1454. doi: 10.1785/0220170095 (2017).

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8d. Non-refereed Journal Articles and Reports not included elsewhere (n = 7; first author n = 4)

1. Toy, V.G. Norris, R.J., Cooper, A.F., Sibson, R.H., Little, T., Sutherland, R., Langridge, R., Berryman, K. Tectonics of the Australian-Pacific Plate Boundary. Field Trip Guide, Geosciences 2016. *Geosciences Society of NZ Miscellaneous Publication* 145B (2016).

2. Toy, V.G., Mitchell, T.M. Photograph of the month. *Journal of Structural Geology* 64, iii. doi: 10.1016/S0191-8141(14)00094-7 (2014).

3. Langridge, R.M. Precise mapping of near-field fault deformation in New Zealand using LiDAR technology: final report, Hazards Platform Contestable Fund. Lower Hutt: GNS Science. *GNS Science report* 2011/44. 59 p. (2011) [note: there were a number of unlisted co-authors, including Toy, V.G. and Barth, N.C. from U Otago].

4. Toy, V.G., Sibson, R.H., Mortimer, N. Faults, fractures, and fluid flow in basement assemblages. Field trip guide: Geosciences '09, Oamaru. *Geological Society of NZ Miscellaneous Publication* 128B, pp. FT2-1-FT2-12 (2009).

5. Toy, V.G., Norris, R.J., Cooper, A.F., Sibson, R.H., Little, T., Sutherland, R., Langridge, R., Berryman, K., Field trip guide: ICDP Workshop on Active Deformation Processes in the Seismogenic Zone of a Major Transpressional Plate Boundary Fault, Franz Josef (New Zealand), 22–28 March 2009, 69pp. (2009).

6. Langridge, R., Little, T., Norris, R., Sibson, R. and Toy, V.G., Field trip guide for a pre-workshop field trip for the DFDP, Alpine Fault, New Zealand, 5-7 Nov. 2007, 52pp. (2007).

7. Black, P.M., Gregory, M.R. and Toy, V.G., Geological Gems of the Far North. Field trip guides, GSNZ Annual Conference "Northland 2002", *Geological Society of NZ Miscellaneous Publication* 112B, pp. 91-110 (2002).

8e. Refereed Conference Proceedings (n = 2; first author n = 1)

1. Hynd, Z., Toy, V.G., Marrero, J., Palacios, P., Yepes, H. Construction of a three-dimensional geological model of Portoviejo to serve as a base for understanding building damage and micro-seismic hazard

assessment. Extended abstract and poster presented at VIII Jornadas de Ciencas de la Tierra, EPN, Quito, Ecuador (2017).

2. Toy, V.G., Toczko, S., Eguchi, N., Maeda, L., Sawada, I., Saruhashi, T., Chester, F., Mori, J. Operations summary during riserless drilling to >7700 mbsl in the Japan Trench for IODP Expedition 343 & 343T JFASTand discussion of the relationship between drilling parameters and rock damage. Abstract and poster presented at Australian Society of Exploration Geophysicists (ASEG) - Petroleum Exploration Society of Australia (PESA) joint Annual Conference, Perth, 15-18 Feb, (2015).

9. Teaching

9a. Courses taught

Note that from 2017-2019 at U Otago I had almost full 'salary buyout' by external research contracts so was not able to commit substantial time to teaching.

Course code and title	Year level	Level of responsibility	Typical class size	Institution	Year(s)	Teaching methods
EAOS 111: Earth and Ocean Science	1st year	Lecturer	150-250	University of Otago	2011-2015	Lectures, practical classes, field trips
GEOL 112: Dynamic Earth	1st year	Lecturer	150-250	University of Otago	2008-2015	Lectures, practical classes, field trips
GEOL271/371: Tectonics	2nd year + 3rd year	Course co-ordinator and lecturer	30-50	University of Otago	2011	Lectures, practical classes, field trips
GEOL275/375: Rock Deformation	2nd year + 3rd year	Course co-ordinator and lecturer	30-50	University of Otago	2015	Lectures, practical classes, field trips
09.065.060: Karten und Profile	2nd year + 3rd year	Practical exercises	20	Universität Mainz	2019	Practical classes
GEOL302: Advanced Field Studies	3rd year	Lecturer	30-50	University of Otago	2008-2016	Field classes + individual supervision of 1-5 students/a
GEOL344: Advanced Field Studies	3rd year	Lecturer	40	University of Otago	2015-2017	Field trips
GEOL344: Applied Structural Geology	3rd year	Course co-ordinator and lecturer	30	University of Otago	2014	Lectures, practical classes, field trips
GEOL351: Structural Analysis of Deformed Rocks	3rd year	Course co-ordinator and lecturer	20-45	University of Otago	2008-2012	Lectures, practical classes, field trips
GEOL353: Tectonics	3rd year	Course co-ordinator and lecturer	45-70	University of Otago	2013-2017	Lectures, practical classes, field trips
GEOL401: Current Topics and Advanced Methods in Geoscience	4th year (Postgraduate level)	Lecturer	10-20	University of Otago	2010-2016	Lectures, practical classes
GEOL430: Structural Geology and Tectonics	4th year (Postgraduate level)	Course co-ordinator and lecturer	5-15	University of Otago	2008-2018	Lectures, practical classes, field trips
GEOL451: Special Topic – cross-crediting of courses delivered at Hokkaido University	4th year (Postgraduate level)	Course co-ordinator and lecturer	3	University of Otago / Hokkaido University	2018	Lectures, practical classes, field trips
GEOL490: BSc(Hons) dissertation	4th year (Postgraduate level)	Supervisor	0-2/a	University of Otago	2009-2017	Individual supervision of research projects
GEOL495: Masters thesis preparation	4th year (Postgraduate level)	Supervisor	0-2/a	University of Otago	2010-2015	Individual supervision of research projects
GEOL5F: Master's thesis	5th year (Postgraduate level)	Supervisor	0-2/a	University of Otago	2008-2018	Individual supervision of research projects

Course code and title	Year level	Level of responsibility	Typical class size	Institution	Year(s)	Teaching methods
Sustainable Development	2nd year	Course co-ordinator and lecturer	20	Yachay Tech University, Ecuador	2016	Lectures. practical classes
Geometric Principals in Structural Geology – and co-ordinator for linked courses in geophysics and sedimentology	Postgraduate		15-20	Hokkaido University, Japan	2015, 2017	Lectures, practical exercises, field trips

9b. Development of significant innovations and/or publications in curriculum development, student assessment, teaching procedures and teaching materials

Throughout my appointment at Otago I have made regular contributions to 1st year lab manuals.

I made significant revisions to GEOL 351, Structural Analysis of Deformed Rocks, particularly in 2008, including rearranging the lecture schedule, introducing ~10 new lectures, introducing ~4 new laboratories, and introducing a second assessed field trip.

I developed three new topics for GEOL 495 students in 2010.

I was co-coordinator for GEOL 302 in 2012 and rewrote parts of the field manual

From 2009-2013 I was involved in extensive re-arrangement of my department's 3rd year course structure, including changing the core paper requirements, designing and co-ordinating extensively revised (e.g. GEOL 344, Advanced Field Geology) and new papers (e.g. GEOL 353, Tectonics; GEOL275/275, Rock Deformation), to reflect changes in teaching staff and student numbers. I continued to develop these courses and revise their content in response to student feedback until the end of 2016.

I co-ordinated, planned, and delivered part of a joint Graduate-level Summer School for International Students in Structural Geology, Geophysics, and Marine Geosciences, with University of Hokkaido, Japan in Aug/Sept 2015. The Structural Geology course was adopted as part of that institutions' 'Summer Institute', supported by the Japanese Government's 'Super Global Universities' program in 2017. In 2018 and 2019 I arranged teaching of 3 similar courses equivalent to 0.2FTE of a 4th year course at Otago and arranged for these points to be cross-credited between our 'exchange partner' institutions.

Yachay Tech University, Urcqui, Ecuador, is a 'startup universtiy' just entering its 3rd year. During Research and Study Leave (ie. sabbatical leave) there in 2016 I developed a module in 'Sustainability of Earth Resources', contributed to development of regulations for a PhD program to be jointly delivered with the University of Potsdam, advised on development of the undergraduate teaching program in Geology and Geotechnical Engineering, and instituted peer review of teaching.

I am planned an MAppSci program in "GRRR: Global Risk, Resource, and Resilience" at the University of Otago, but have yet to establish it. I hope to do so at my new institution in Germany, and to establish it as a cross-institutional, perhaps multi-national course.

9c. Teaching administration and leadership, quality assurance, evaluation

I have attended the following workshops and courses organized by the University of Otago's Higher Education Development Centre (HEDC):

Forum on development of a Postgraduate Certificate in Researcher Development – June 2017

Seminars: Supervising postgraduate students at a distance – 3 June 2015; Impacts of continuous assessment – 19 Aug 2012

Workshops: Postgraduate supervision – 11 July 2012; Negotiating authorship – 2012; Key Processes for Supervisors of Research Students –2010

Invited participant in University of Otago Student Learning Centre Focus Group on "how to use student evaluations to improve your teaching" – 2013

I participated in the HEDC Postgraduate Research Supervisors' program – 2010-2011

Invited member of academic staff interview panel for the University of Otago Academic Audit – Oct 2011

Member of Department of Geology Web Advisory Committee – 2012-2013

Outreach co-ordinator, Department of Geology – 2011-2018

Member, Department of Geology Postgraduate Advisory Committee, 2009-2018

Examiner for U Otago PhD Thesis, Arran Murch, 2018.

Examiner for U Otago PhD Thesis, Meike Siedemann, 2017

Examiner for U Otago MSc Thesis, Andrew Holt, 2017

Examiner for U Otago PhD Thesis, Rachel Murtagh, 2011

Examiner for Victoria University of Wellington MSc Thesis, Ben Gillam, 2013

10. Referees

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