

## **CURRICULUM VITAE (September 2015)**

### **Luc L. Lavier, Ph.D.**

Jackson School of Geosciences, The University of Texas at Austin

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[scholar.google.com/citations?user=q42H8hEAAAAJ&hl=en](https://scholar.google.com/citations?user=q42H8hEAAAAJ&hl=en)

[www.researcherid.com/rid/G-6141-2010](http://www.researcherid.com/rid/G-6141-2010)

### **RESEARCH INTERESTS**

Geodynamic, tectonic and rheological evolution of plate boundaries, rifting, subduction, mountain building

Rheology of Earth materials (Rocks, Ice)

Numerical modeling of lithospheric deformation and ice sheets evolution

Development of new computational methods to simulate large deformation of Earth's materials

**PERSONAL DATA** Born 14 October 1967, Dijon, France, married, two children (son, daughter)

### **EDUCATION**

1999 Ph.D. Earth & Environmental Sciences, Columbia University, NY

1997 M.Phil. Earth & Environmental Sciences, Columbia University, NY

1991 M.Sc. Tectonics & Geophysics (D.E.A.), Université de Montpellier, France

1990 B.S. Theoretical Physics (Maîtrise), Université de Besançon, France

### **PROFESSIONAL APPOINTMENTS**

2014- Associate Professor, University of Texas Austin (UT), Department of Geological Sciences

2014- Associate Research Professor, University of Texas Austin, Institute for Geophysics (UTIG)

2008- Affiliated faculty member, University of Texas Austin (UT), Institute for Computational Sciences and Engineering (ICES)

2008-2014 Assistant Professor, University of Texas Austin (UT), Department of Geological Sciences

- 2008-2014 Assistant Research Professor, University of Texas Austin, Institute for Geophysics (UTIG)
- 2003-2008 Research Associate, University of Texas Austin, Institute for Geophysics (UTIG)
- 2002-2003 Assistant Research Scientist, Seismological Laboratory, Geological and Planetary Science Division, California Institute of Technology (CALTECH)
- 2001-2002 Postdoctoral Fellow in Tectonics, Seismological Laboratory, Geological and Planetary Science Division, California Institute of Technology (CALTECH)
- 1999-2001 Postdoctoral Scholar, GeoForschungZentrum Potsdam (GFZ), Potsdam, Germany
- 1994-1999 Graduate Research Assistant, Department of Earth and Environmental Sciences, Lamont-Doherty Earth Observatory, Columbia University, NY
- 1994-1999 Graduate Research Assistant, Department of Earth and Environmental Sciences, Lamont-Doherty Earth Observatory, Columbia University, NY
- 1992-1994 Research Assistant (employed by Elf Exploration Production), Lamont-Doherty Earth Observatory, Columbia University, NY
- 1990-1992 Research Assistant, Research Center in Pau, Elf Exploration Production, Pau, France

## **PROFESSIONAL AWARDS AND RECOGNITION**

- 2014 Invited Professor (15 Janury 2014-15 February 2014), Conseil National des Universités (CNU, France), Institut de Physique du Globe de Paris, Paris, France.
- 2013-2018 Qualifié aux fonctions de professeur des universités, section Terre solide: Géodynamique des enveloppes supérieures, Spring 2013: Conseil National des Universités, France
- 2007- 2009 Jackson School of Geosciences, Jackson Research Excellence Fellow Award, University of Texas (UT)
- 2007- 2008 Invited Professor (3 summer months), Herbette fellowship, Swiss National Science Foundation, University of Lausanne, Department of Petrology, Switzerland.
- 2004- 2005 Invited Researcher (2 summer months), Conseil National des Universités (CNU, France), University Louis Pasteur, Department of Geology, Strasbourg, France.
- 2001- 2002 California Institute of Technology, Postdoctoral Fellowship in Tectonics, Division Geological and Planetary Sciences (CALTECH)
- 1999- 2001 GeoForschungsZentrum Potsdam Postdoctoral Fellowship, GeoForschungsZentrum Potsdam, Germany (GFZ)

- 1994-1999 Columbia University Faculty Fellowship, Columbia University, Dept. of Earth & Environmental Sciences. Columbia University, NY
- 1991-1994 Foreign Research Program (Volontaire Service National Scientifique), French Foreign Ministry, France

## **ADVISING AND STUDENT SERVICE**

**Graduate students supervision (UT), 12 Ph.D. (2 completed) and 2 M.Sc. (2 completed)** (Name, degree, **period supervised, supervision, expected completion, advancement**, research title)

- 13 James Biemiller, Ph.D. student in the Department of Geological Sciences  
**Period: 08/2014-current, Lavier co-supervisor, Fall 2015**, Relationship between long-term and short-term deformation mechanisms and patterns in active rift environments and subduction zones.
12. Xinyue Tong, Ph.D. student in the Department of Geological Sciences  
**Period: 08/2014-current, Lavier supervisor, Fall 2014**, Effect of seamount impingement on Earthquake cycle in subduction zone.
11. Rodrigo D Lima, Ph.D. student in the Department of Geological Sciences  
**Period: 08/2013-current, Lavier co-supervisor, Fall 2014**, The record of semibrittle extension in hyperextended margins.
10. Nicole Rita Hart, M.Sc. student in the Department of Geological Sciences  
**Period: 08/2009-current. Lavier co-supervisor, Spring 2014**, Coupled bedrock and detrital thermochronometry of a hyper-extended continental margin, Mauléon, Pyrenees
9. Joshua K. Davis, Ph.D student in the Department of Geological Sciences  
**Period: 08/2009-current. Lavier supervisor, Spring 2016, Ph.D. candidate**, Plate tectonic reconstruction including continental deformation evaluation.
8. Anna Svartman Dias, Ph.D student in the Department of Geological Sciences  
**Period: 07/2011-current. Lavier supervisor, Spring 2015, passed qualifying examination**, Subsidence and thermal evolution of hyperextended rifted margins.
7. Guangliang Wu, Ph.D. student in the Department of Geological Sciences  
**Period: 07/2010-current, Lavier supervisor, Fall 2014, Passed qualifying examination**, Lithospheric extension in orogens: State of stress, crustal flow, and metamorphic core complexes.
6. Cassandra Brown, Ph.D. student in the Department of Geological Sciences  
**Period: 07/2010-current, Lavier co-supervisor, Fall 2014, Ph.D. candidate**, Constraints on fault and fracture mechanics in the upper oceanic crust.
5. Guy Gregory Fitz, Master student in the Department of Geological Sciences

**Period: 07/2009-08/2011. Lavier co-supervisor, degree completed,** Offshore mapping and modeling of Miocene-Recent extensional basins adjacent to metamorphic gneiss domes of the D'Entrecasteaux Islands, eastern Papua New Guinea.

4. Elizabeth Stacia Logan, Ph. D student in the Department of Geological Sciences

**Period: 07/2009-current. Lavier supervisor, Spring or Fall 2014, Ph.D. candidate,** Modes of Deformation in Ice: the Formation of basal Crevasses and their role in Iceberg Calving.

3. Dan Eakin, Ph. D student in the Department of Geological Sciences

**Period: 07/2009-12/2015. Lavier supervisor, degree completed 11/2014,** An analysis of subduction related tectonics offshore southern and eastern Taiwan.

2. Ryan Lester, Ph. D student in the Department of Geological Sciences

**Period: 07/2009-06/2013. Lavier supervisor, degree completed 05/2013,** From Rifting To Collision: The Evolution Of The Taiwan Mountain Belt.

1. Patel Paresh, PhD candidate in the Department of Geological Sciences

**Period 2003-2012. Lavier co-supervisor, student terminated**

#### **Graduate students research committee service (UT)**

##### **IN PROGRESS**

13. Emily Hernandez Goldstein, Ph.D student in the Department of Geological Sciences

**Period: 07/2012-current.** Supervisor: Daniel Stockli

12. Gail Gutowski, Ph.D student in the Department of Geological Sciences

**Period: 07/2013-current.** Supervisor: Don Blankenship

11. Marina C. Frederik, Ph.D student in the Department of Geological Sciences

**Period: 07/2011-current.** Supervisor: Sean Gulick

10. Adam Goldsmith Ph.D student in the Department of Geological Sciences

**Period: 07/2012-current.** Supervisor: Daniel Stockli

9. Jeff Liu, Ph.D student in the Department of Geological Sciences

**Period: 07/2010-current.** Supervisor: Jung Fu Lin

8. Ruddra Chatterjee, Ph. D student in the Department of Geological Sciences

**Period: 2009-current.** Supervisor: John Lassiter

##### **COMPLETED**

7. Drew Eddy, Ph.D student in the Department of Geological Sciences

**Period: 2010-2014.** Supervisor: Harm Van Avendonk

Ph.D. Dissertation title: Mesozoic rifting along the eastern seaboard of North America: insights from the seismic velocity structure of the Newfoundland margin and the northern Gulf of Mexico

6. Xia Yu, Ph.D student in Department of Geological Sciences

**Period: 2006-2013.** Supervisor: Steve Grand

**Thesis title:**

5. Yang Wang, M.Sc. student in the Department of Geological Sciences  
**Period: 2010-2013.** Supervisor, Steve Grand,  
 Thesis title: Shear Velocity Structure and Mineralogy of the Transition Zone beneath the East Pacific Rise.
4. Jennifer Worthen, Ph.D student in the Computational and Applied Mathematics,  
**Period: 2007-2012.** Supervisor: Omar Ghattas,  
 Ph.D. Dissertation title: Inverse Problems in Mantle Convection: Models, Algorithms, and Applications.
3. Kylara Martin, Ph.D student in the Department of Geological Sciences  
**Period: 2005-2010.** Supervisor: Sean Gulick  
 Ph.D. Dissertation title: Geophysical investigations in the Nankai Trough and Sumatran subduction zones.
2. Lindsay Lowe, Ph. D student in the Department of Geological Sciences  
**Period: 2005-2010.** Supervisor: Sean Gulick  
 Ph.D. Dissertation title: New Geophysical Parameters for Understanding the Evolution of the St. Elias Orogen, Southern Alaska.
1. Derek Sawyer, Ph. D student in the Department of Geological Sciences  
**Period: 2007-2010.** Supervisor: Peter Flemings  
 Ph.D. Dissertation title: Failure Mechanics, Transport Behavior, and Morphology Of Submarine Landslides.

#### **Undergraduate Student research supervision (UT)**

1. John B. Desanto, Undergraduate Honors Thesis (completed).  
**Period 2011-2013.** Lavier, co-supervisor

#### **Graduate students supervision (Outside UT), 4 Ph.D. (3 completed)** (name, degree, place, **Period, supervision, expected completion**, research title when completed)

4. Pauline Chenin, Ph.D student at the University Louis Pasteur, Strasbourg, France  
**Period: 2012-Current. Lavier co-supervisor (supervisor: Gianreto Manatschal), 2016.**
3. Suzon Jammes, Ph.D student at the University Louis Pasteur, Strasbourg, France  
**Period: 2006-2009. Lavier co-supervisor (supervisor: Gianreto Manatschal), degree completed,** Processus d'amincissement crustal en contexte transtensif: L'exemple du golfe de Gascogne et des Pyrenees Basques.
2. Eun-Seo Choi, Ph.D student at the Seismological Laboratory, California Institute of Technology (CALTECH), Pasadena  
**Period: 2003-2008. Supervisor: Michael Gurnis, degree completed,** Computational approaches to localized deformation within the lithosphere and for crust-mantle interactions.
1. Patricia Persaud, Ph. D. student at the Seismological Laboratory, California Institute of

Technology (CALTECH), Pasadena

**Period: 2003-2008. Supervisor: Joann Stoke, degree completed,** Images of Early Continental Breakup in and around the Gulf of California and the Role of Basal Shear in Producing Wide Plate Boundaries

**Student research theses:** thesis title, degree, institution, supervision

Svartman Dias, A. E., 2015, *THE EVOLUTION OF HYPEREXTENDED RIFTED MARGINS: linking variations on the width, asymmetry, and strain distribution to lithospheric strength and geodynamic processes* Ph.D. thesis, University of Texas at Austin, **Lavier supervisor.**

Hart, N. H., 2015, *Coupled bedrock and detrital thermochronometry of a hyper-extended continental margin, Mauléon, Pyrenees,* , M.Sc. thesis, University of Texas at Austin, **Lavier co-supervisor.**

Eakin, D. H., 2014, *An analysis of subduction related tectonics offshore southern and eastern Taiwan,* University of Texas at Austin, **Lavier supervisor.**

Lester, W. R., 2013, *From Rifting To Collision: The Evolution Of The Taiwan Mountain Belt,* Ph.D. thesis, University of Texas at Austin, **Lavier supervisor.**

Fitz, G. G., 2011, *Offshore mapping and modeling of Miocene-Recent extensional basins adjacent to metamorphic gneiss domes of the D'Entrecasteaux Islands, eastern Papua New Guinea,* M.Sc. thesis, University of Texas at Austin, **Lavier co-supervisor.**

Jammes, S., 2009, *Extreme crustal thinning in a transtensional setting : the example of Bay of Biscay-Western Pyrenees.* Thèses de doctorat, Université de Strasbourg, **Lavier co-supervisor.**

Choi, E., 2009, *Computational approaches to localized deformation within the lithosphere and for crust-mantle interaction,* Ph.D. thesis, CALTECH, **Lavier Collaborator/advisor.**

Persaud, P., 2004, *Images of Early Continental Breakup in and around the Gulf of California and the Role of Basal Shear in Producing Wide Plate Boundaries,* Ph.D. thesis, CALTECH, **Lavier Collaborator/advisor.**

**Postdoctoral research supervision,** 8 postdoctoral associates mentored

8. Jacqueline Reber (PhD in Geology, Uppsala University, 2012)

**Period: 01/3/2013-current.**

7. Suzon Jammes (PhD in Geophysics, University of Strasbourg, 2009)

**Period: 01/3/2013-current.**

6. Eunseo Choi (PhD in Geodynamics, California Institute of Technology, 2008)

**Period: 31/1/2011-31/12/2012. Now Assistant Professor at the University of Memphis, TN, 2013.**

5. Eh Tan (PhD in Geodynamics, California Institute of Technology, 2008)

**Period: 9/1/2009-31/1/2011. Now Research Professor in Geodynamics at Academia**

**Sinica in Taipei, Taiwan.**

4. Ravindra Duddu (PhD in Computational Mechanics, Northwestern University, 2008)

**Period: 9/1/2008-8/2010. Now Assistant Professor at the School of Engineering at Vanderbilt University, Nashville, TN.**

3. Corey Trahan (PhD in Physics, University of Texas at Austin, 2003)

**Period: 9/1/2008-8/2010. Now at Army Corps of Engineers, Alabama.**

2. Nathan Downey (PhD in Geophysics, California Institute of Technology, 2008)

**Period: 9/1/2007-8/2009. Now researcher at ExxonMobil Upstream Research Company.**

1. Wolfgang Bangerth (PhD in Applied Mathematics, University of Heidelberg, Germany, 2002)

**Period: 9/1/2003-8/2005. Now Associate professor in Applied Mathematics at Texas A&M.**

### **Letters of Recommendation for Students and Postdoctoral scholars**

Letters for applications for employment, graduate admissions, and research grants. Total > 50 since 2003

## **COMMITTEE SERVICE (UT)**

**Committees, Jackson School of Geosciences, Department of Geological Sciences, Institute for Geophysics, Institute for Computational Engineering and Sciences**

2015- 2016 Institute for Geophysics, Member of the strategic plan committee for Tectonophysics.

2015 Institute for Geophysics, Member the annual evaluation committee.

2014- 2015 Department of Geological Sciences, Chair of the Faculty Geophysics Search Committee.

2013- 2014 Department of Geological Sciences, Member of the Faculty Geophysics Search Committee chaired by Steve Grand.

2012- 2013 Institute for Geophysics, Member of the Research Associate Search Committee chaired by Gail Christeson.

2008- 2010 Institute for Computational Engineering and Sciences, Member of the King Abdullah University of Science and Technology (KAUST) Faculty search committee chaired by Omar Ghattas.

2007- 2009 Jackson School of Geosciences, Chair of the Core/Mantle/Crust Search Committee.

2009- 2010 Department of Geological Sciences, Seminar committee.

2005- 2006 Institute for Geophysics, Computer equipment management committee.

## **PROFESSIONAL SERVICE**

### **Memberships in Professional Societies**

American Geophysical Union since 1994

European Geophysical Union from 2000 to 2005

Geological Society of America since 2008

### **Editorial service**

2009-2013 Associate editor, G-cubed, Geophysics-Geochemistry-Geodynamics, AGU (American Geophysical Union), (5 years term).

### **Professional committees**

2003- Representative member of the University of Texas at Austin for the Computational Infrastructure in Geodynamics (CIG, [www.geodynamics.org](http://www.geodynamics.org)), center now located at the University of California Davis and funded by the National Science Foundation.

2008-2010 Computational Infrastructure in Geodynamics (CIG), Science Steering Committee Member. Long-term crustal deformation,

2006, IODP SSEP meeting in Houston May 2006, Intermittent panel member.

2006-2007 Continental break-up mission (IODP), member of the executive writing committee led by John Hopper (TAMU).

2004-2006 Computational Infrastructure in Geodynamics (CIG), group leader with Sean Willett for the development of codes for the Geodynamic Modeling of Tectonic deformation.

### **Chaired sessions, professional conferences**

2005, American Geophysical Union, spring meeting, New Orleans 2005, session G43B, Regional and Global-scale Plate Kinematics and Dynamics From Geodetic, Geological and Geophysical observation, co-convener: Giovanni Sella, Northwestern University.

2005, American Geophysical Union, spring meeting, New Orleans 2005, session T42A, The Ocean-Continent Transition at Rifted Continental Margins: What is it, How is it formed, and How do We Locate it?, co-convener: Ian Norton, Exxon-Mobil.

1998, American Geophysical Union, spring meeting, Boston 1998, session T31, Strain partitioning during continental rifting, co-convener: W.R. Buck.

### **National Science Foundation Workshop convener**

2005, June 10-12, Geodynamic modeling of tectonic processes, Colorado, Convener. In collaboration with EAR Tectonics (David Fountain). Co-conveners: Dennis Harry (University of Alabama) and Sean Willet (now at ETH Zurich, Switzerland).



### **Professional workshops**

- 2013, May, Tectonics of Taiwan: an International Conference, Taipei, Taiwan, May 15<sup>th</sup>.
- 2012, October, YOUNG Conjugate MARGIN Laboratory (YOCMAL), French National Agency for Research (ANR), Biarritz, France.
- 2012, August, Computational Infrastructure in Geodynamics (CIG, NSF), Mantle Convection and Lithospheric Dynamics Workshop, Davis, California, University of California, Davis.
- 2011, September, South California Earthquake Center (SCEC) annual meeting, SDOT Interdisciplinary Group - What Is Needed To Make Progress On Understanding Stress Transfer From Plate Motion To Crustal Faults?
- 2011, January, NSF Geoprim workshop, Subduction Factory, participant, Austin, TX.
- 2011, November, Working Group on South Atlantic Margins, Petrobras, Rio de Janeiro, Brazil.
- 2010, November, NSF Geoprim workshop, Rifting Evolution and Initiation, participant, Santa Fe, NM.
- 2010, October, 35th Workshop of the International School of Geophysics Non-Steady-State Subduction: Changes in the Calabrian Arc and its Mediterranean Setting, Erice, Sicily, Italy.
- 2010, June, Computational Infrastructure in Geodynamics (CIG), participant, Golden, CO, Crustal Deformation Modeling Workshop.
- 2010, January, III Workshop de Riftes e Margens Continentais, Salvador, Brazil.
- 2008, October, GeoMod, Modeling of Geological Processes International Workshop, Florence, Italy.
- 2007, August 26<sup>th</sup>-31<sup>st</sup>, CATSCAN II, Calabria Geodynamics workshop at LDEO, Columbia University, Activity Report of the NSF Continental Dynamics funded project CATSCAN II.
- 2007, April, TAIGER workshop, Austin, TX, Geodynamics aspects of the NSF funded project TAIGER.
- 2006, September, CATSCAN II, Calabria Geodynamics workshop, Cosenza, Italy, September 9<sup>th</sup> to 14<sup>th</sup>, Field trip and Geodynamics aspects of the NSF Continental Dynamics funded project CATSCAN II.
- 2006, March, TAIGER workshop, Los Angeles, CA, March 28<sup>th</sup> to April 5<sup>th</sup>, Geodynamics aspects of the NSF funded project TAIGER.
- 2006, September, IODP (International Ocean Drilling Program) workshop, participant, September 15<sup>th</sup> to 18<sup>th</sup>, Pontresina, Switzerland, Investigating Continental Break-Up and Sedimentary Basin Formation.
- 2006, February, Earthscope GEOTRAVERSE, participant, February 3<sup>rd</sup> to 5<sup>th</sup>, St Louis, MO, Conveners: Ben van der Pluijm and Basil Tikoff, Defined GeoEarthScope Geochronology.

2005, March, Earthscope GEOTRAVERSE, participant, March 28, Santa Ana Pueblo, NM, Conveners: Ben van der Pluijm and Basil Tikoff, It is an attempt to define a geological oriented approach to Earthscope through the use of transects across the US continent.

2005, October, TAIGER workshop, Taipei, October 28<sup>th</sup> to November 3<sup>rd</sup>, Continuous development of the NSF funded project TAIGER.

2005, September, CAT-SCANII workshop, Rome, September 24-27, NSF, EAR Continental Dynamics funded workshop to develop the next phase of the Geodynamics study of Calabria, proposal submitted in November 2005.

2004, January, Computational Infrastructure in Geodynamics (CIG), participant, January 16-17, Los Angeles, USA, Defining the structure and the goals of the CIG for the Geodynamics community in the US.

2004, February, Mid-Atlantic Ridge Workshop (RIDGE 2000), participant, February 29 – March 2, Providence, Rhode Island, Defining the future focus areas off the mid Atlantic Ridge.

2004, July, InterMARGINS Workshop (IMEDL 2004), participant, July 11-16, Pontresina, Switzerland, Benchmarking of numerical models for modeling the evolution of continental rifting.

2003, January, Applied Geodynamic Laboratory (AGL) workshop, participant, Bureau of Economic Geology (BEG), Jackson School of Geosciences, University of Texas at Austin.

### **Professional Performance Reviews**

Evaluation of research and teaching performance by assistant professors and research scholars.

*Total: 4 letters (2011-present)*

### **Proposal Reviews**

Reviewer of proposals to National Science Foundation (NSF) and other organizations.

*Total: ~30 reviews (2003-present)*

### **Manuscript Reviews**

Nature, Science, Geophysical Research Letters, Geology, Terra Nova, Journal of Geophysical Research, Earth and Planetary Science Letters, GSA Bulletin, Tectonics, G-cubed, Geophysical Journal International, Lithosphere.

*Total: ~50 reviews (2000-present)*

### **Doctoral Thesis Evaluation Committees (Outside UT)**

2010, June 8<sup>th</sup>, Louise Watremez, Structure profonde et évolution du Nord du Golfe d'Aden oriental : sismique réfraction et modélisation thermomécanique, Université Paris VI- Jussieu, France.

2009, May 10<sup>th</sup>, Suzon Jammes, Processus d'amincissement crustal en contexte

transensif: L'exemple du golfe de Gascogne et des Pyrenees Basques. Université Louis Pasteur- Strasbourg, France.

2006, May 4<sup>th</sup>, Gwenn Péron-Pinvidic, Morphotectonique et architecture sédimentaire de la transition ocean-continent de la marge ibérique. Université Louis Pasteur- Strasbourg, France.

## **SOFTWARE DEVELOPMENT**

2015- Principal Investigator and co-developer of 2D and 3D meshless solver for solid and fluid deformation in a consistent abstracted solver.

2011- Principal Investigator and lead developer of DynEarthSol 2D and 3D (Dynamic Earth Solver 2D and 3D). New flexible and fast finite element algorithm to model tectonic deformation within an unstructured and adaptive Lagrangian mesh (<https://bitbucket.org/tan2/dyneearthsol2>).

2003- 2007 Lead developer of the software SNAC (StgermaiN Analysis of Continua) to model the tectonic deformation of the lithosphere in 3D ([www.geoframework.org](http://www.geoframework.org)).

1997- Active participant in the continuous development of PARAVOZ Software to model the tectonic deformation of the lithosphere in 2D, first developed by Yuri Podlatchikov (ETH, Zurich, Switzerland) and Alexei Poliakov (Center for National Research, Montpellier, France) and based on the FLAC (Fast Lagrangian Analysis of Continua) algorithm (Cundall, 1989, University of Minnesota, USA).

## **PUBLICATIONS**

Papers (#papers published 48, h-index 18 (SCI), 20 (Google); average citation 30 (SCI), total citations: 1956 (Google))

Journal Publications (peer reviewed) (\* Student publication; \*\*Postdoc Publication)

### **2015**

**\*\*52.** Jammes, S. and L.L. Lavier, The effect of biminerale composition on extensional processes at lithospheric scale, submitted to Gcubed, 2015.

**51.** Van Avendonk, Harm J.A. , Kirk D. McIntosh, Hao Kuo-Chen, Luc L. Lavier, David A. Okaya, Francis T. Wu, Chao-Shing Lee, and Char-Shine Liu, A lithospheric profile across northern Taiwan: From arc-continent collision to extension, Submitted to Geophysical Journal International, 2015.

**\*\*50.** Smye, A. J., L. L. Lavier, Stockli, D. F., Zack, T., Top-down mechanism to rift continental lithosphere, submitted to Nature Magazine, 2015.

**\*49.** Svartman Dias, A. E., Lavier, L. L., and N. W. Hayman, Factors controlling the transition between stretching and thinning during continental breakup, in revision JGR, 2015.

**\*48.** P. Chenin, G. Manatschal, L.L. Lavier, D. Erratt, Assessing the impact of orogenic inheritance on the architecture, timing and magmatic budget of the North Atlantic rift

system: a mapping approach, *Journal of the Geological Society*, 2014-139 September 9, 2015, doi:10.1144/jgs2014-139.

- \*\*47. J.E. Reber, L.L. Lavier, N.W. Hayman, Experimental demonstration of a semi-brittle origin for crustal strain transients, *Nature Geoscience* 8 (9), 712-715.
- \*46 Guangliang Wu, Luc L. Lavier, Eunseo Choi, Modes of continental extension in a crustal wedge, *Earth and Planetary Science Letters*, Volume 421, 1 July 2015, Pages 89-97, ISSN 0012-821X, <http://dx.doi.org/10.1016/j.epsl.2015.04.005>.
- \*45. Thirumalai, K., Frederick W. Taylor, Chuan-Chou Shen, Luc L. Lavier, Cliff Frohlich, Laura M. Wallace, Chung-Che Wu, Hailong Sun, Alison K. Papabatu, Variable Holocene deformation above a shallow subduction zone extremely close to the trench, accepted, *Nature Communications* 6, Article number: 7607, doi:10.1038/ncomms8607.
- \*\*44. Jammes, S., L. L. Lavier, and J. E. Reber, Localization and delocalization of deformation in a biminerale material. *J. Geophys. Res. Solid Earth*, 120, 3649–3663. doi:10.1002/2015JB011890, 2015.
- \*43. Eakin, D. H., K. D. McIntosh, H. J. A. Van Avendonk, and L. L. Lavier, New geophysical constraints on a failed subduction initiation: The structure and potential evolution of the Gagua Ridge and Huatung Basin, *Geochem. Geophys. Geosyst.*, 16, 380–400, doi:10.1002/2014GC005548, 2015.
42. Gianreto Manatschal, Luc Lavier, Pauline Chenin, The role of inheritance in structuring hyperextended rift systems: Some considerations based on observations and numerical modeling, *Gondwana Research*, Volume 27, Issue 1, January 2015, Pages 140-164, ISSN 1342-937X, <http://dx.doi.org/10.1016/j.gr.2014.08.006>.

## 2014

41. Van Avendonk, H. V. A., H. Kuo-Chen, K.D. McIntosh, L.L. Lavier, D.A. Okaya, F.T. Wu, C.Y. Wang, C.S. Lee, and C.S. Liu Deep crustal structure of an arc-continent collision: Constraints from seismic travel times in central Taiwan and the Philippine Sea, in press, *Journal of Geophysical Research: Solid Earth*, 2014. doi:10.1002/2014JB011327
- \*\*39. Jammes, S., P. Persaud, L. Lavier, G. Manatschal, Correction to “Extreme crustal thinning in the Bay of Biscay and the Western Pyrenees: From observations to modeling”, *Geochemistry, Geophysics, Geosystems*, published Feb. 1<sup>st</sup> 2014.
38. Manatschal, G., L. Lavier and P. Chenin, The role of inheritance in structuring hyperextended rift systems: Some considerations based on observations and numerical modelling, *Gondwana Research*, published October 2014, doi: 10.1016/j.gr.2014.08.006
- \*\*37. Reber, J. E., Nicholas W. Hayman and Luc L. Lavier, Stick-slip and creep behavior in lubricated granular material: Insights into the brittle-ductile transition, *Jacqueline E., Geophysical Research Letter*, Volume 41, Issue 10, pages 3471–3477, 28 May 2014
36. McIntosh, K. D., Van Avendonk, H. J. A., Lavier, L. L., R. Lester, C.S. Liu, D., Eakin, C. S. Lee, Crustal structure and inferred rifting processes in the northeast South China Sea, *Marine and Petroleum Geology*, 2014.

- \*35. Eakin, D., McIntosh, K., Van Avendonk, H. J. A., Lavier, L. L., W. R. Lester, C.S. Liu, C. S. Lee, Crustal-scale seismic profiles across the Manila subduction zone: the transition from intra-oceanic subduction to incipient collision, *Journal of Geophysical Research: Solid Earth* 119 (1), 1-17, 2014.
35. Hayman N. and Lavier, L. L., The Geologic Record of Deep Transient Slip and Tremor, *Geology* 42 (3), 195-198, 2014.
- \*34. Lester, R., Van Avendonk, H. J. A., McIntosh, K., Lavier, L. L., Lui, C. S., Wang, T. K., Rifting and Magmatism in the Northeastern South China Sea from Wide-Angle Tomography and Seismic Reflection Imaging, *Journal of Geophysical Research: Solid Earth* 119 (3), 2305-2323, 2014.

## 2013

- \*33. Lester, R., McIntosh, K. D., Van Avendonk, H.J.A. and Lavier, L. L., Crustal accretion in the Manila trench accretionary wedge at the transition from subduction to mountain-building in Taiwan. *Earth and Planetary Science Letters*, <http://dx.doi.org/10.1016/j.epsl.2013.06.007>, 2013.
- \*32. Logan, S. L., G. Catania, L. L. Lavier and E. Choi, A novel method of basal crevasse height estimation, *Journal of Glaciology* 59, 216, pp. 750-758, 2013.
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Continental Crust, *Geology*, September 2012, v. 40, p. 831-834, first published on July 12, doi:10.1130/G33142.1, 2012. (cited 5).

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9. Buck, W. R. and L. L. Lavier, A Tale of Two Kinds of Normal Fault: The Importance of Strain Weakening in Fault Development, Non-volcanic rifting of continental margins: a comparison of evidence from land and sea, *Geological Society Special Publications* 187, pp. 340-355, 2001. ([cited 9](#)).

8. Lavier, L. L., M. S. Steckler and F. Brigaud, Climatic and Tectonic Control on the Cenozoic Evolution of the West African Margin, *Marine Geology*, 178, pp. 63-80, 2001. ([cited 94](#)).

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6. Lavier, L. L., M.S. Steckler and F. Brigaud, An improved method for reconstruction of the stratigraphy and bathymetry of continental margins: Application to the Cenozoic tectonic and sedimentary history of the Congo margin, *Amer. Assc. Petrol. Geol.* 84, 7, pp. 923-939, 2000. ([cited 30](#)).

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4. Lavier L. L., Modeling of Lithospheric Deformation: Application to the evolution of rifting and Passive Margins, Ph.D. Thesis, Columbia University, New York, 1999.
3. W. R. Buck, Lavier, L. L. and A. B. N. Poliakov, How to make a rift wide?, *Philosophical transaction of the Royal Society* 357, pp. 671-690, 1999. (cited 61).

## 1998

2. Steckler M. S., S. Feinstein, B. P. Khon, L. L. Lavier and M. Eyal, Pattern of mantle thinning from subsidence and heat flow measurements in the Gulf of Suez: Evidence for the rotation of Sinai and along-strike flow from the Red Sea, *Tectonics* 6, pp. 903-920, 1998. (cited 27).

## 1997

1. Lavier, L. L. and M. S. Steckler, The Effect of Sedimentary Cover on the Flexural Strength of Continental Lithosphere, *Nature*, vol. 389, pp. 476-479, 1997. (cited 53).

## Professional Reports

7. Lavier, L. L., Subsidence and thermal evolution of hyperextended rifted margins, Petrobras, Rio de Janeiro, Brazil, 2013.
6. Lavier, L. L., Subsidence and thermal evolution of hyperextended rifted margins, Petrobras, Rio de Janeiro, Brazil, 2012.
5. Lavier, L. L., The Subsidence History of Block H, Total SA, La defense, Paris, France, 2012.
4. Lavier, L. L., Modeling The Tectonic Subsidence and Thermal History at Magma Poor Margins: A Dynamical Approach, ExxonMobil Upstream Research Center, 2011.
3. Lavier, L. L., Modellierung der Evolution von Störungssystemen während Rifting-Prozessen, Zweijahresbericht 1998/1999, GeoForschungsZentrum Potsdam, p 296-299, 2001.
2. Lavier, L. L., M. S. Steckler & F. Brigaud, Thermo-Mechanical Evolution of the Congo-Angolan Margin: Parametrization of Flexural Rigidity of the Continental Margin from Rheologic Models, Internal report, Elf Exploration Production, Pau, France, 1997.
1. Lavier, L. L., F. Brigaud & M. S. Steckler, Tectonic and Thermal History of the West African Margin in Angola, Internal report, Elf Aquitaine Production, Pau, France, 1993.

## Books

1. Lavier, L. L., Calo, V. and Bourantas G., Computational Tectonics, 2015. A Book



describing the fundamentals of Geophysics, Geology and Computational Geosciences necessary to study the tectonic evolution of the Earth's Lithosphere. (Matlab tools included), *in prep.*

## **SCHOLARLY PRESENTATIONS**

### **Invited Lectures and keynote lectures at Universities, Workshops and Conferences**

*Total: 25 presentations since 2005 (45-60 minutes each) + 1 tutorial with lectures*

- 2015 - Possible transient creep events in a brittle-ductile continental crust: observations, experiments and potential models, Seminar ETH, Zurich, Zurich, Switzerland, April 2015.
- 2015 - Possible transient creep events in a brittle-ductile continental crust: observations, experiments and potential models, University of Luxembourg, Luxembourg, April 2015.
- 2014 - The styles of deformation in hyperextended rifted margins (Seminar in the at Conoco-Phillips), November 19-21, 2014.
- 2014 - The Nature of semibrittle deformation: Examples from the field, analogue and numerical experiments. (Seminar in the Tectonics group at the Institut de Physique du Globe de Paris), January 2014.
- 2013 - 2 days lectures (14 hours) on Computational Tectonics at Seoul National University, South Korea, August 11<sup>th</sup> to August 16<sup>th</sup>.
- 2013 - Tectonics of Taiwan: an International Conference (TITOC), Taipei, Taiwan, May 15<sup>th</sup> 2013, Numerical Models of Subduction to Arc-Continent Collision.
  - Institut de Physique du Globe Paris (IPGP), Friday April 5<sup>th</sup> 2013. Structural evolution of arc-continent collisions: what can we learn from geology and numerical modeling?
  - YOUNG Conjugate MARGIN Laboratory (YOCMAL), French National Agency for Research (ANR), Biarritz, France, October 2012.
- 2012 - Department seminar at Southern Methodist University (SMU), Dallas, September 2012.
  - Computational Infrastructure in Geodynamics (CIG, NSF), Mantle Convection and Lithospheric Dynamics Workshop, Davis, California, July 29, 2012 to August 02, 2012, University of California, Davis
- 2011 - South California Earthquake Center (SCEC) annual meeting, Palm Springs, September, SDOT Interdisciplinary Group - *What Is Needed To Make Progress On Understanding Stress Transfer From Plate Motion To Crustal Faults?*
  - Petrobras, Rio de Janeiro, Brazil, November 2010, *Taking outcrop scale deformation processes into large-scale models of the thermal and mechanical evolution of rifts.*
  - NSF Geoprism meeting November 2010, Santa Fe, NM, Keynote speaker, A

- modeling perspective on rifting.*
- 35th Workshop of the International School of Geophysics Non-Steady-State Subduction: Changes in the Calabrian Arc and its Mediterranean Setting, Erice, Sicily, Italy, October 2010, Keynote speaker, *Roll-back stiff or soft?*
  - NSF, CIG (Computational Infrastructure in Geodynamics), June 2010 Golden, CO, Crustal Deformation Modeling Workshop, Keynote speaker, *A model for ductile shear initiated by shear fracture: Application to short term and secular fault slip.*
  - III Workshop de Riftes e Margens Continentais, Salvador, Brazil, January 2010, Invited speaker, *Progress and future challenges in understanding and modeling the processes controlling the evolution and the modeling of rifting.*
- 2009 - Caltech Seismo Lab Seminar April, 2009, Pasadena, CA, *Modeling of subduction to collision: The example of Taiwan.*
- Yale University Seminar January, 2009, New Haven, CT, *A model for ductile shear initiated by shear fracture: Application to slow slip events.*
- 2008 - GeoMod 2008, Florence, Italy, Invited Lecture on *Continental Extension.*
- Seminar lecture on the Ocean-Continent Transition at the French National
- 2007 - Académie des Sciences, *Modeling the rheological evolution of rifting at the Ocean-Continent Transition*, September 2007, Paris, France.
- 2006 - Solid Earth Geophysics seminar at Princeton University, March 16<sup>th</sup> 2006.
- Department seminar at Texas A&M, October 2006.
  - ISES summer school lecture, August 2006: *Numerical models of deformation: Implications of rheology.*
  - Earth Science Revolution Workshop Lecture, Dr. Katherine Ellins and Dr. Hilary Olson, November 16<sup>th</sup> 2006, *How to Break a Continent?*
- 2005 - Department seminar at the University of Arizona, November 10<sup>th</sup> 2005.
- Department seminar at the University of South California, October 7<sup>th</sup> 2005.
  - Department seminar at the IGP Strasbourg, France, June 3<sup>rd</sup> 2005.
  - Department seminar at Rice University, April 10<sup>th</sup> 2005.

### **Invited Presentations: First-Authored Abstracts**

*Total: 6 presentations since 2005 (15-20 minutes each)*

- 2015 Spring EGU 2015, Vienna, EGU2015-7864 INVITED, *The thermal and magmatic consequences of the transition from distributed stretching to localized thinning during rifting.*
- 2011 Fall AGU 2011, San Francisco, T15F INVITED, *Exhumation of Mantle-Derived Rocks at Divergent Plate Boundaries: Mechanisms and Consequences.*
- 2010 Fall AGU 2010, San Francisco, T51F INVITED, *A model for ductile shear initiated by shear fracture: Application to slow slip events.*
- 2007 Fall AGU 2007, San Francisco, T14 INVITED, *Predictions From Numerical Models of Continental Extension Using Ductile Failure.*

- Fall AGU 2007, San Francisco, T38 INVITED, *Numerical Models of Subduction to Collision in Taiwan*.
- 2005 Fall AGU 2005, San Francisco, T52B-04 INVITED, *A Mechanism for Thinning the Continental Lithosphere at Magma-Poor Margins*.

### **Most Recent Presentations with Published Abstracts**

#### **(Selected from American Geophysical Union: AGU From 2009 to 2013)**

- Jammes, S., L. L. Lavier, J. E. Reber, Effect of polymineralic crustal composition on deformation processes, In *AGU Fall Meeting Abstracts*, 2013.
- McIntosh, K. D., H. Kuo-Chen, H. J. Van Avendonk, L. L. Lavier, F. T. Wu, D. A. Okaya, Two-dimensional seismic velocity models of southern Taiwan from TAIGER transects, In *AGU Fall Meeting Abstracts*, 2013.
- Tan, E., E. Choi, L. L. Lavier, V. M. Calo, DynEarthSol3D: An Efficient and Flexible Unstructured Finite Element Method to Study Long-Term Tectonic Deformation, In *AGU Fall Meeting Abstracts*, 2013.
- Eakin, D. H., L. L. Lavier, K. D. McIntosh, H. J. Van Avendonk, Origins and evolution of the Gagua Ridge bathymetric feature: A Possible example of failed subduction competition with the Manila trench, In *AGU Fall Meeting Abstracts*, 2013.
- Taylor, F. W., K. Thirumalai, L. L. Lavier, C. Frohlich, C. Shen, C. Wu, H. Sun, A. K. Papabatu, Coral Paleo-Uplift History Overlying a Very Shallow AD 2007 Megathrust Rupture of the Western Solomons Forearc: Deficit of Interseismic Subsidence Results in Net Long-Term Uplift, In *AGU Fall Meeting Abstracts*, 2013.
- Wu, G., L. L. Lavier, Origin of metamorphic core complexes and detachment faults, In *AGU Fall Meeting Abstracts*, 2013.
- N. W. Hayman, L. L. Lavier, Granular and semi-brittle descriptions of slip and creep, In *AGU Fall Meeting Abstracts*, 2013.
- Svartman Dias, A., L. L. Lavier, N. W. Hayman, Rifted margins width and subsidence history: the effect of crustal thickness and lithospheric rheology, In *AGU Fall Meeting Abstracts*, 2013.
- Van Avendonk, H. J., H. Kuo-Chen, K. D. McIntosh, L. L. Lavier, F. T. Wu, D. A. Okaya, Seismic velocity structure of the Taiwan mountain belt along TAIGER transect T5, In *AGU Fall Meeting Abstracts*, 2013.
- Wu, F. T., H. Kuo-Chen, K. D. McIntosh, D. A. Okaya, L. L. Lavier, A Comprehensive View Of Taiwan Orogeny From TAIGER Perspective, In *AGU Fall Meeting Abstracts*, 2012.
- Van Avendonk H. J., McIntosh K. D., Lavier L. L., Wu F. T., Okaya D. A. and H. Kuo-Chen, A lithospheric seismic profile across northern Taiwan, from arc-continental collision to extension, In *AGU Fall Meeting Abstracts*, 2012.
- Choi E., Buck W R., Lavier L. L., Petersen K. D., Bounds on fault strength based on simulation of "rider block" structures emerging from brittle lithosphere extension, In *AGU Fall Meeting Abstracts*, 2012.
- Taylor F. W., Lavier L. L., Bevis M. G.; Thirumalai K., Frohlich C. A., Relationships between plate convergence, the earthquake cycle, and long-term accumulation of net

- tectonic deformation at island arcs; not so simple as it seems, In *AGU Fall Meeting Abstracts*, 2012.
- Taylor F. W., Thirumalai K., Shen C-C, Wu; C-C., Papabatu A., Lavier; L. L. Bevis M. G., Coral record of paleoseismic uplifts at Ranongga Island, Western Solomon Islands megathrust: Was the 2007 Mw 8.1 event smaller than usual? In *AGU Fall Meeting Abstracts*, 2012.
- Lester R.; McIntosh K. D., Lavier L. L., Van Avendonk H. J., Rift Structure and Distribution of Magmatic Activity of the Southern Chinese Continental Margin Offshore Southern Taiwan from Reflection Imaging, Travel-time Tomography and 1D Thermal Modeling, In *AGU Fall Meeting Abstracts*, 2012.
- Eakin D. H., McIntosh K. D., Van Avendonk H. J.; Lavier L. L., Milestones in arc-continent collision evolution: The transition from intra-oceanic subduction to incipient collision, In *AGU Fall Meeting Abstracts*, 2012.
- Wu G., Lavier L. L., Choi E., Two styles of faulting associated with metamorphic core complexes: Importance of initial crustal configuration and mid-crustal flow, In *AGU Fall Meeting Abstracts*, 2012.
- Kirk D. McIntosh; Harm J. Van Avendonk; Luc L. Lavier; Ryan Lester; Daniel H. Eakin; Francis T. Wu (Invited), Inversion of a hyper-extended rifted margin in the southern Central Range of Taiwan, In *AGU Fall Meeting Abstracts*, 2012.
- Svartman Dias A. E., Lavier L. L.; Hayman N. W., Manatschal G., Pinto V. H., Subsidence and uplift history of hyperextended margins and a self-consistent mechanism of depth-dependent thinning of the lithosphere, In *AGU Fall Meeting Abstracts*, 2012.
- Lavier, L. L., and O. Muntener. "Modeling Mantle Shear Zones, Melt Focusing and Stagnation-Are Non Volcanic Margins Really Magma Poor?." In *AGU Fall Meeting Abstracts*, 2011.
- Okaya, D. A., H. Sato, L. L. Lavier, E. Tan, F. T. Wu, and N. Hirata. "The Pacific and Philippine Sea slabs in contact beneath Tokyo, central Japan: their roles in defining hazardous interaction earthquakes and in limiting the southern extent of Tohoku-oki aftershocks." In *AGU Fall Meeting Abstracts*, 2011.
- Tan, E., L. Lavier, and H. van Avendonk. "Friction and stress coupling on the subduction interfaces." In *AGU Fall Meeting Abstracts*, 2011.
- Fitz, G. G., P. Mann, and L. L. Lavier. "Regional tectonic context, timing, and intrusion mechanism of gneiss domes, eastern Papua New Guinea, from offshore seismic reflection and well data." In *AGU Fall Meeting Abstracts*, 2011.
- Wu, F. T., H. Kuo-Chen, S. W. Roecker, L. Lavier, and Taiwan Taiger Teams. "TAIGER Results and Tectonics of Taiwan." In *AGU Fall Meeting Abstracts*, 2011.
- Wu, F. T., H. Kuo-Chen, S. W. Roecker, L. Lavier, and Taiwan Taiger Teams. "TAIGER Results and Tectonics of Taiwan." In *AGU Fall Meeting Abstracts* 2011.
- Logan, L.; Catania, G.; Lavier, L. L., Observations and Modeling of Grounding Line

- Basal Crevasse: Connections between Surface Speed, Topography and Crevasse Morphology. In *AGU Fall Meeting Abstracts*, 2011.
- Lester, W. R.; Lavier, L. L.; McIntosh, K. D., Active Extension in Taiwan's Pre-collision Zone: A New Model of Plate-Bending in Continental Crust. In *AGU Fall Meeting Abstracts*, 2011.
- McIntosh, K. D., H. J. Van Avendonk, L. L. Lavier, W. R. Lester, and D. H. Eakin. "Tomographic Models of Southern Taiwan Demonstrate Likely Evolution of the Arc-Continent Collision." In *AGU Fall Meeting Abstracts*, 2011.
- Logan, L., L. L. Lavier, and R. A. Bennett. Models of Slow Slip Events Using a Strain Wave Formulation in a Lithosphere Perturbed by Fluid Filled Shear Fractures. In *AGU Fall Meeting Abstracts*, 2010.
- Lavier, L L ; Bennett, R A. A model for ductile shear initiated by shear fracture: Application to slow slip events and secular transients. (Invited). In *AGU Fall Meeting Abstracts*, 2010.
- Taylor, F W ; Lavier, L L ; Bevis, M G ; Frohlich, C A ; Grand, S ; Papabatu, A K. Subduction of very rugged seafloor topography imposes stronger interplate coupling and elevated mean stress levels at the Western Solomon Islands forearc. In *AGU Fall Meeting Abstracts*, 2010.
- Logan, L; Lavier, L L ; Bennett, R A. Models of Slow Slip Events Using a Strain Wave Formulation in a Lithosphere Perturbed by Fluid Filled Shear Fractures. In *AGU Fall Meeting Abstracts*, 2010.
- Lavier, L L ; Bennett, R A. A model for ductile shear initiated by shear fracture: Application to slow slip events and secular transients. (Invited). In *AGU Fall Meeting Abstracts*, 2010.
- Wu, F T; Kuo-Chen, H; Lavier, L L; Unsworth, M J; Bertrand, E A. Toward A Tectonic Synthesis Of Taiwan With TAIGER Data. In *AGU Fall Meeting Abstracts*, 2009.
- Kuo-Chen, H; Wu, F T; Roecker, S W; Lavier, L L. The transition zone from subduction to collision beneath the Taiwan orogen: joint inversion of explosion, local and teleseismic events from TAIGER experiment . In *AGU Fall Meeting Abstracts*, 2009.
- Jammes, S; Manatschal, G; Lavier, L L. How is crust thinned in an oblique environment: the example of Bay of Biscay-Western Pyrenees? In *AGU Fall Meeting Abstracts*, 2009.
- Logan, E S; Lavier, L L ; Wu, F T ; Okaya, D A ; McIntosh, K D; Kuo-Chen, H; Van Avendonk, H J. Numerical Models of Subduction to Arc-Continent Collision: The case of Taiwan. In *AGU Fall Meeting Abstracts*, 2009.
- Downey, N J; Lavier, L L. Dynamic models of a Taiwan-like orogeny. In *AGU Fall Meeting Abstracts*, 2009.
- Lavier, L L ; Bennett, R A. Slow Earthquakes Controlled by Semi-Brittle Instabilities. In *AGU Fall Meeting Abstracts*, 2009.

Trahan, C J; Lavier, L L; Bennett, R A. Models of Slow Slip Event Using a 3D Membrane Lithosphere Perturbed by Shear Fractures. In *AGU Fall Meeting Abstracts*, 2009.

Duddu, R; Calo, V M; Lavier, L L. An arbitrary Lagrangian-Eulerian formulation for modeling large strain deformations in accretionary wedges in three dimensions. In *AGU Fall Meeting Abstracts*, 2009.

## **RESEARCH GRANTS AND CONTRACTS (funded)**

18. National Science Foundation (EAR/Tectonics, EAR-1524729), Lavier co-P.I., Main P.I: L. Wallace, 2015-2017, Using the World's Fastest Slipping Normal Fault to Understand the Mechanics of Low-angle Normal Faults, **UT budget:** \$300,000.

17. ExxonMobil Upstream Research Company (URC), Main P.I: Luc Lavier 2013-2016, Center for Excellence in Basin Analysis (CEIBA), **UT budget:** \$300,000

16. National Science Foundation (EAR/Tectonics), Lavier co-P.I., Main P.I: Frederic Taylor (UTIG) 2011-2013, The earthquake cycle and its role in permanent vertical deformation in the Western Solomons arc from coral paleogeodesy of the past few centuries, **UT budget:** \$420,198

15. King Abdullah University of Science and Technology (KAUST) Lavier main P.I., 2011-2014, in collaboration with Victor Calo (Assistant Professor at KAUST), Numerical Modeling of the Tectonic and Thermal Evolution of Continental Rifting, **UT budget:** \$890,861.91

14. Petrobras, Brazil, 2011-2017, Lavier main P.I., co- PI: Nick Hayman Rift Research Group at the University of Texas at Austin. **UT budget:** \$960,000

13. National Science Foundation, EAR, Continental Dynamics Program, Lavier co-P.I., Main P.I.: Francis Wu, Binghamton University, co-P.Is at UT: Kirk McIntosh, Harm van Avendonk, co P.Is: David Okaya (University of Southern California) 2009-2011, Collaborative Research: Taiwan Integrated Geodynamics Research II. **UT budget:** \$814,928

12. National Science Foundation, CDI-Type II, co-P.I., 2009-2013, Lavier co-investigator, Main P.I. at UT (Omar Ghattas), co P.Is at UT: Don Blankenship, Ginny Catania, Marc Hesse, Charles Jackson: Dynamics of Ice Sheets: Advanced Simulation Models, Large-Scale Data Inversion, and Quantification of Uncertainty in Sea Level Rise Projections. **UT budget:** \$1,261,307

11. King Abdullah University of Science and Technology (KAUST), Lavier Main P.I., 2008-2009, in collaboration with Victor Calo (Assistant Professor at KAUST), Modeling and High-Performance Simulation of Earth Materials in Large Deformation. **UT budget:** \$580,444

10. Exxon-Mobil, Upstream Research Center, 2009-2010, Lavier Main P.I., Modeling the Tectonic Subsidence and Thermal History at Magma-poor Margins: A

- Dynamical Approach. **UT budget:** \$100,000
9. Total exploration, France, 2009-2010, Main P.I., The effects of magma transfer and sedimentation on rifting. **UT budget:** \$30,000.
  8. National Science Foundation, EAR, Continental Dynamics Program, 2006-2010, Lavier co-P.I., Main P.I: Michael Steckler (Columbia University (LDEO)), co P.Is ,Columbia Univeristy (LDEO): Joerg Schaefer, Alberto Malinverno, Colin Stark, Nano Seeber, Berkeley Lab: R. C. Finkel, Univerty of Arizona, Stuart Thompson, Uplift and faulting at the transition from subduction to collision – a field and modeling study of the Calabrian Arc. **UT budget:** \$400,000.
  7. National Science Foundation, OCE, ODP Program, 2006-2009, Lavier co-P.I., Main PI at UT: Craig Fulthrop, Jamie Austin, The North West Shelf, Australia: The Next Step in a Global Approach to Understanding the Role of Eustasy in the Generation and Preservation of Stratigraphy. **UT budget:** \$464,278.
  6. National Science Foundation, EAR, Tectonics Program, 2005-2007, Lavier Main P.I., University of Arizona P.I.: Richard Bennett, Collaborative Research: Constraining Fault Displacement Histories and Lithospheric Dynamics using Geology and Geophysics. **UT budget:** \$80,832.
  5. National Science Foundation, EAR, Continental Dynamics Program, 2004-2008, Lavier co-P.I., Main P.I.: Francis Wu, Binghamton University, co-P.Is at UT: Kirk McIntosh, Harm van Avendonk, co P.Is: David Okaya (University of Southern California) , Nikolas Christensen (University of Wisconsin), Larry Brown (Cornell University), Steve Roecker (Rensselaer Polytechnic Institute), Martyn Unsworth (University of Alberta), Collaborative Research: Taiwan Integrated Geodynamics Research. **UT budget:** \$814,928.
  4. Exxon Mobil Upstream Research Company, 2004-2007, Lavier main P.I., Rheological implications and thermal consequences of extremes extension in the ultra-deepwater continental margins of the south Atlantic basins. **UT budget:** \$18,730.
  3. Jackson School of Geosciences, 2005-2006, co-investigator, From Slab to Surface: Imaging Magma Rise and Storage beneath Active Volcanoes.
  2. GXT company, Houston, 2005-2006, co-investigator, Ocean-bottom seismic refraction data offshore Nigeria or Angola.
  1. National Science Foundation, EAR, Geophysics, 2000-2002, co-investigator, Faulting during rifting.

## **TEACHING**

### **Courses Taught, UT Department of Geological Sciences (GEO) (4 credits each)**

Fall 2015, GEO327 K Geoscience through the lens of art.

Spring 2014, GEO325J Introduction to Computational Geosciences/Matlab-Fortran Programming.

Fall 2014, GEO327 K Geoscience through the lens of art.

Spring 2013, GEO325J Introduction to Computational Geosciences/Matlab-Fortran Programming.  
Spring 2012, GEO325J Introduction to Computational Geosciences/Matlab-Fortran Programming.  
Spring 2011, GEO325J Introduction to Computational Geosciences/Matlab-Fortran Programming.  
Spring 2011, GEO354 Physics of the Earth.  
Fall 2010 GEO 391 Continuum Mechanics (New Class).  
Spring 2010, GEO325J Introduction to Computational Geosciences/Matlab-Fortran Programming.  
Spring 2010, GEO 354 Global Geophysics/Physics of the Earth.  
Spring 2010 GEO 338T Marine Tectonics.  
Spring 2009 GEO325J Introduction to Computational Geosciences/Matlab-Fortran Programming (New Class)  
Fall 2008 GEO 391 Earth Dynamics.  
Fall 2007 GEO 391 Earth Dynamics.  
Fall 2006 GEO 391 Earth Dynamics (New Class).

### **Courses Taught outside of UT**

2005, Faculty (August 5-12 2005 at Colorado College): A Summer School in Integrated Solid Earth Sciences (ISES) in Rheology of Earth Materials, teaching of Numerical models of deformation: Implications of rheology.

2000, GeoForschungsZentrum Potsdam, Fall semester, Lectures on modeling of lithospheric deformation and the formation shear zones during a short course for the Frei Universität Berlin (in English).

1997, Columbia University, Fall semester, Teaching Assistant for Planet Earth (undergraduate class) taught by Professor Roger Anderson.

1995, Columbia University, Individual tutoring of a summer intern for a research project: Reconstruction of the tectonic and sedimentary history of the Congo continental margin.

### **RESEARCH KEYWORDS**

Geophysics, Tectonophysics, Geodynamics, Physics of the Earth, Computational Geophysics, Lithospheric Dynamics, Rifting, Mountain Building, Subduction, Stratigraphy, Past climates, Passive margins, Rheology, Fluids and Deformation, Localization of deformation, Continuum mechanics, Computational Mechanics, Plate tectonic, field geology.