

PhD genealogy of Jon Claerbout; Ancestry and legacy.

Sjoerd de Ridder

ABSTRACT

PhD genealogy is the practice of tracing ones thesis adviser's adviser, and so on. To first order this provides a lineage of academic teaching and thinking. For the Stanford Exploration Project's 40th anniversary, I compiled Jon Claerbout's academic lineage. The SEP is one of the world's most infamous academic research groups in seismic imaging, and Jon Claerbout graduated many PhD students through this project himself. This report goes beyond the usual academic genealogy in that it also attempts to compile an academic legacy for Jon Claerbout. An online, and up-to-date copy of this academic genealogy, will be made available online.

INTRODUCTION

This paper outlines the PhD ancestry and legacy of Jon Claerbout, founder of the Stanford Exploration Project in 1973. First attempts to study this lineage started during my summer internship at BP in 2010, and the earliest generations were easily traced through the websites of the Massachusetts Institute of Technology. With the help of Wikipedia and various other university libraries, we trace the lineage to a variety of fields: geology, physics, mathematics, philosophy, theology, medicine and more. The website of the Mathematics PhD genealogy project¹ proved particularly resourceful.

ANCESTRY

Jon received his PhD under Theodore Madden, himself a graduate of MIT. Several generations earlier we find the famous physicist Robert Millikan, conductor of the famous "oil drop" experiment and a Nobel laureate, working at Caltech. Robert Millikan graduated with Albert Michelson, another Nobel laureate, and Michael Pupin at Columbia University. Another line traces to the geology department at the University of Wisconsin. This line started with Roland Irving, whose academic roots are unclear at this time. Irving's arrival at Wisconsin marked the start of the geology program, one of the strongest of the nation. Irving is also the earliest known academic

¹<http://genealogy.math.ndsu.nodak.edu/>

adviser found in Jon's PhD genealogy in the new world. Both Albert Michelson and Michael Pupin graduated at the University of Berlin, with none other than the famous Hermann von Helmholtz, whose last name is honored in the Helmholtz equation.

The earliest roots are not in fields of physics or mathematics at all, but rather in medicine, philosophy and theology. Studies at the time were less rigid; studies in philosophy would easily combine with work in mathematics. The PhD degree in its modern form did not exist and was not widely awarded either. The mathematics genealogy project traces student-teacher relationships in the absence of degrees. In this lineage we find Jakob Thomasius. At the University of Leipzig, Thomasius counted Gottfried Leibniz, inventor of calculus, among his students. Thomasius himself graduated with Gottfried Leibniz's father, Friedrich Leibniz. Another notable academic was Johannes Argyropoulos, who obtained a degree in theology from the University of Padua. Argyropoulos later taught at the University of Florence where he is said to have found Leonardo da Vinci attending his lectures.

The earliest academic roots of Jon trace to Nilos Kabasilas, a fourteenth-century bishop of Thessalonika who was passionate about the philosophies of Saint Thomas.

I Jon F. Claerbout 1967 Massachusetts Institute of Technology, Electromagnetic Effects of Atmospheric Gravity Waves. Advisor: Theodore R. Madden (II).

II Theodore R. Madden, 1961 Massachusetts Institute of Technology, Electrode polarization and its influence on the electrical properties of mineralized rocks. Advisor: Stephen M. Simpson (III).

III Stephen M. Simpson, 1953, Massachusetts Institute of Technology, Statistical approaches to certain problems in geophysics. Advisor: Patrick M. Hurley (IV).

IV Patrick M. Hurley, 1940 Massachusetts Institute of Technology, Investigations on the helium method of age determination. Advisors: Robley D. Evans (Va) and Warren J. Mead (Vb).

Va Robley D. Evans, California Institute of Technology. Advisor: Robert A. Millikan (VIa).

Vb Warren J. Mead, University of Wisconsin. Advisor: Charles K. Leith (VIb).

VIa Robert A. Millikan, Columbia University. Advisor: Michael I. Pupin (VIIa) and Albert Michelson (VIIb).

VIb Charles K. Leith, 1901 University of Wisconsin, Rock Cleavage. Advisor: Charles R. Van Hise (VIIIb).

VIIa Michael I. Pupin, University of Berlin. Advisor: Hermann von Helmholtz (VIIIa).

VIIb Albert A. Michelson, University of Berlin. Advisor: Hermann von Helmholtz (VIIIa).

VIIIa Hermann von Helmholtz, Royal Friedrich-Wilhelm Institute. Advisor: Johannes Peter Müller (IXa).

VIIIb Charles R. Van Hise, 1892 University of Wisconsin. ('USGS Monograph

19 on field investigations of the PenokeeGogebic Iron Range' might have been his thesis). Advisor: Roland D. Irving (IXb).

IXa Johannes Peter Müller, Bonn University. Advisor: Philipp Franz von Walther (Xa) and Karl Rudolphi (Xb).

IXb Roland D. Irving graduated from the Columbia University School of Mines in New York and arrived at the University of Wisconsin in 1870. Irving's initial appointment, marking the beginning of the geology program, was in Mining and Metallurgy. In 1878 Irving became professor in a newly created Department of Mineralogy and Geology.

Xa Philipp Franz von Walther, University of Landshut. Advisor: Georg Joseph Beer (XIa).

Xb Karl Rudolphi, University of Greifswald. Advisor: Christian von Weigel (XIIb).

XIa Georg Joseph Beer, University of Vienna. Advisor: Joseph Barth (XIIa).

XIb Christian von Weigel, University of Göttingen. Advisor: Johann Christian Erxleben (XIIb).

XIIa Joseph Barth, University of Vienna. Advisor: Anton von Störck (XIIIa).

XIIb Johann Christian Erxleben, University of Göttingen. Advisor: Abraham Gotthelf Kästner (XIIIb).

XIIIa Anton von Störck, University of Vienna. Advisor: Gerard van Swieten (XIVa).

XIIIb Abraham Gotthelf Kästner, University of Leipzig. Advisor: Christian August Hausen (XIVb).

XIVa Gerard van Swieten, University of Leyden. Advisor: Hermann Boerhaave (XVa).

XIVb Christian August Hausen, University of Wittenberg. Advisor: Johann Christoph Wichmannshausen (XVb).

XVa Hermann Boerhaave, Universiteit van Leiden. Advisor: Burchard de Volder (XVIa).

XVb Johann Christoph Wichmannshausen, University of Leipzig. Advisor: Otto Mencke (XVIb).

XVIIa Burchard de Volder, University of Basel. Advisor: Franciscus de le Boë (XVIIa).

XVIIb Otto Mencke, University of Leipzig. Advisor: Jakob Thomasius (XVIIb).

XVIIa Franciscus de le Boë, University of Basel. Advisor: Emmanuel Stupanus (XVIIIa).

XVIIb Jakob Thomasius, University of Leipzig. Advisor: Friedrich Leibniz (XVIIIb).

XVIIIa Emmanuel Stupanus, University of Basel. Advisor: Petrus Ryff (XIX).

XVIIIb Friedrich Leibniz, 1622 University of Leipzig. Disputatio de Casibus perplexis in Jure.

XIX Petrus Ryff, 1584 University of Basel, *De Affectibus cordis*. Advisor: Theodor Zwinger (XX).

XX Theodor Zwinger, 1553 The College of France; MD at University of Padua 1559. Advisors: Petrus Ramus (XXIa) (The College of France), Bassiano Landi (XXIb) (University of Padua) and Vittore Trincavelli (XXIc) (University of Padua).

XXIa Petrus Ramus, 1536 The College of Navarre, *Quaecumque ab Aristotele dicta essent, commentitia esse*. Advisors: Johannes Sturm (XXIIa) and Jacques Toussain (XXIIb).

XXIb Bassiano Landi, 1542 MD University of Padova. Advisors: Giovanni Battista della Monte (XXIIc) and Vittore Trincavelli (XXIId).

XXIIa Johannes Sturm, 1527 Catholic University of Leuven. Advisors: Nicolas Clnard (XXIIIa), Johannes Winter von Andernach (XXIIIb).

XXIIb Jacques Toussain, 1521 University of Paris. Advisor: Guillaume Budé (XXIIIc).

XXIIc Giovanni Battista della Monte, University of Padova; MD University of Ferrara. Advisors: Marco Musuro (XXIIId) (University of Padova), Pietro Pomponazzi (XXIIIe) (University of Padova) and Niccolò Leoniceno (XXIII f) (University of Ferrara).

XXIId Vittore Trincavelli, MD University of Padova. Advisor: Pietro Pomponazzi (XXIIIe).

XXIIIa Nicolas Clénard, 1515 Catholic University of Leuven; 1521 Theol. Dr. at Catholic University of Leuven. Advisors: Jacobus Latomus (XXIVa) and Jan van Campen (XXIVb).

XXIIIb Johannes Winter von Andernach, 1527 MD at Catholic University of Leuven; 1532 The College of Tréguier. Advisors: Rutger Rescius (XXIVc) and Jacobus Sylvius (XXIVd).

XXIIIc Guillaume Budé, 1486 University of Orléans; 1491 University of Paris. Advisors: Georgius Hermonymus and Janus Lascaris (XXIVe).

XXIIId Marco Musuro, 1486 University of Firenze. Advisor: Janus Lascaris (XXIVe).

XXIIIe Pietro Pomponazzi, 1487 University of Padova. Advisors: Nicoletto Vernia (XXIVf) and Pietro Roccabonella (XXIVg).

XXIII f Niccolò Leoniceno, 1446 University of Vicenza; 1453 MD University of Padova. Advisor: Ognibene Bonisoli da Lonigo (XXIVh) (University of Vicenza), Pelope (University of Padova) and Pietro Roccabonella (XXIVg) (University of Padova).

XXIVa Jacobus Latomus, 1502 The College of Montaigu; 1519 Theol. Dr. at Catholic University of Leuven. Advisors: Jan Standonck (XXVa) (The College of Montaigu).

XXIVb Jan van Campen, Theol. Dr. at Catholic University of Leuven; 1519 University of Ingolstadt. Advisors: Matthaëus Adrianus and Johann Reuchlin (XXVb).

XXIVc Rutger Rescius, 1513 at University of Paris. Advisor: Girolamo Aleandro (XXVc).

XXIVd Jacobus Sylvius, University of Paris; 1530 MD University of Montpellier. Advisors: Francois Dubois (XXVd) and Jean Tagault.

XXIVe Janus Lascaris, 1472 University of Padova. Advisors: Basilios Bessarion (XXVIIa) and Demetrios Chalcocondyles (XXVe).

XXIVf Nicoletto Vernia, 1472 University of Padova. Advisor: Gaetano da Thiene.

XXIVg Pietro Roccabonella, MD University of Padova. Advisor: Gaetano da Thiene (University di Padova) and Sigismondo Polcastro (University di Padova).

XXIVh Ognibene Bonisoli da Lonigo, University of Mantova. Advisor: Vittorino da Feltre (XXVIIc).

XXVa Jan Standonck, 1474 The College of Sainte-Barbe; 1490 The College of Montaigu.

XXVb Johann Reuchlin, 1477 University of Basel; 1481 University of Poitiers. Advisors: Johannes Argyropoulos (XXVIa) and Jacob ben Jehiel Loans.

XXVc Girolamo Aleandro, 1499, 1508 Theol. Dr. Universit di Padova. Advisors: Moses Perez and Scipione Fortiguerra (XXVIb).

XXVd Francois Dubois, 1516 University of Paris.

XXVe Demetrios Chalcocondyles, Mystras; Roman Academies. Advisor: Theodoros Gazes (XXVIc).

XXVIa Johannes Argyropoulos, 1444 University of Padua; 1481 Theol. Dr. University of Poitiers. Advisor: Basilios Bessarion (XXVIIa).

XXVIb Scipione Fortiguerra, 1493 University of Firenze. Advisor: Angelo Poliziano (XXVIIb).

XXVIc Theodoros Gazes, 1433 Constantinople; University of Mantova. Advisor: Vittorino da Feltre (XXVIIc).

XXVIIa Basilios Bessarion, 1436 Mystras. Advisor: Georgios Plethon Gemistos (XXIXa).

XXVIIb Angelo Poliziano, 1477 University of Firenze. Advisor: Marsilio Ficino (XXIXb) and Cristoforo Landino.

XXVIIc Vittorino da Feltre, 1416 University of Padova. Advisor: Guarino da Verona (XXIXc).

XXIXa Georgios Plethon Gemistos, 1380, 1393, *Nómoi* (Book of Laws). Advisor: Demetrios Kydones (XXXa) and Elissaeus Judaeus.

XXIXb Marsilio Ficino, 1462 University of Firenze. Advisor: Johannes Argyropoulos.

XXIXc Guarino da Verona. Advisor: Manuel Chrysoloras (XXXb).

XXXa Demetrios Kydones. Advisor: Nilos Kabasilas (XXXI).

XXXb Manuel Chrysoloras. Advisor: Demetrios Kydones (XXXa).

XXXI Nilos Kabasilas, a fourteenth-century bishop of Thessalonika who was passionate about the philosophies of Saint Thomas.

LEGACY

Here I attempt to compile an academic legacy of Jon Claerbout. By no means can this legacy be considered complete or flawless, and it is not meant to establish an authoritative or exhaustive document on adviser-advisee relationships of any of the people mentioned. The vast majority of Jon's SEP students were trained in the SEP. Some of his students went on to advise and graduate many students themselves who in turn went on to have their own advisees.

I Jon F. Claerbout

1967 Massachusetts Institute of Technology, Electromagnetic Effects of Atmospheric Gravity Waves.

Graduates at Stanford University:

1. Allen Stratton?
2. Tom E. Landers, 1971 Stanford University, Elastic waves in laterally inhomogeneous media.
3. Lee Lu, 1972 Stanford University, The relation of local pressure fluctuations to large-scale meteorology and the simulation of acoustic-gravity waves in inhomogeneous media.
4. Donald C. Riley, 1974 Stanford University, Wave Equation Synthesis and Inversion of Diffracted Multiple Seismic Reflections.
5. Stephen M. Doherty, 1975 Stanford University, Structure Independent Seismic Velocity Estimation.
6. John Parker Burg, 1975 Stanford University, Maximum Entropy Spectral Analysis.
7. Philip S. Schultz, 1976 Stanford University, Velocity Estimation by Wave Front Synthesis.
8. Raul Estevez, 1977 Stanford University, Wide-Angle Diffracted Multiple Reflections.
9. Robert J. Godfrey, 1979 Stanford University, A Stochastic Model for Seismogram Analysis.
10. Ozgodan Yilmaz, 1979 Stanford University, Pre-Stack Partial Migration.
11. William C. Gray, 1979 Stanford University, Variable Norm Deconvolution.
12. Walter S. Lynn, 1979 Stanford University, Velocity Estimation in Laterally Varying Media.
13. Heloise Bloxson Lynn, 1979 Stanford University, Migration and Interpretation of Deep Crustal Seismic Reflection Data.
14. Einar Kjartansson, 1979 Stanford University, Attenuation of Seismic Waves and Applications in Energy Exploration.
15. Robert W. Clayton, follows under (IIa).
16. Laurence C. Morley, 1981 Stanford University, Predictive Techniques for Marine Multiple Suppression.
17. Alfonso Gonzalez-Serrano, 1982 Stanford University, Wave Equation Velocity Analysis.
18. Richard A. Ottolini, 1982 Stanford University, Migration of Reflection Seismic Data in Angle-Midpoint Coordinates.

19. Allan Jacobs, 1982 Stanford University, The Pre-Stack Migration of Profiles.
20. Ira David Hale, follows under (IIb).
21. Jeffrey R. Thorson, 1984 Stanford University, Velocity Stack and Slant Stack Inversion Methods.
22. John L. Toldi, 1985 Stanford University, Velocity Analysis Without Picking.
23. Daniel H. Rothman, follows under (IIc).
24. Joshua M. Ronen, 1985 Stanford University, Multichannel Inversion in Reflection Seismology.
25. William S. Harlan, 1986 Stanford University, Signal/Noise Separation and Seismic Inversion
26. Zhiming Li, 1986 Stanford University, Imaging Steep-Dip Reflections by the Linearly Transformed Wave Equation Method.
27. Peter Mora, follows under (IIId).
28. Kamal Mansour Al-Yahya, 1987 Stanford University, Velocity Analysis by Iterative Profile Migration
29. Stewart A. Levin, 1987 Stanford University, Deconvolution with Spatial Constraints.
30. Charles Hege Sword, 1987 Stanford University, Tomographic Determination of Interval Velocities from Reflection Seismic Data: The Method of Controlled Directional Reception.
31. Paul J. Fowler, 1988 Stanford University, Seismic Velocity Estimation Using Prestack Time Migration.
32. Marta Jo Woodward, 1989 Stanford University, Wave Equation Tomography.
33. Clement Kostov, 1990 Stanford University, Multichannel Seismic Experiment with a Drill-Bit Source.
34. Biondo L. Biondi, follows under (IIe).
35. Johannes A. van Trier, 1990 Stanford University, Tomographic Determination of Structural Velocities from Depth-migrated Seismic Data.
36. John T. Etgen, 1990 Stanford University, Residual Prestack Migration and Interval-Velocity Estimation.
37. Joe A. Dellinger, 1991 Stanford University, Anisotropic Seismic Wave Propagation.
38. Carlos A. Cunha Filho, 1992 Stanford University, Elastic Modeling and Migration in Earth Models.
39. Lin Zhang, 1992 Stanford University, Imaging by the Wave Front Propagation Method,
40. Reinaldo J. Michelena, 1992 Stanford University, Anisotropic Traveltime Tomography.
41. Dave Nichols, 1994 Stanford University, Imaging in Complex Structures Using Band-limited Green's Functions.
42. Martin Karrenbach, 1995 Stanford University, Elastic Tensor Wave Fields.
43. Alexander M. Popovici, 1995 Stanford University, Migration to Zero Offset in Variable Velocity Medium.
44. Stephen P. Cole, 1995 Stanford University, Passive Seismic and Drill-Bit Experiments Using 2-D Arrays.

45. Dimitri Bevc, 1995 Stanford University, Imaging Under Rugged Topography and Complex Velocity Structure.
46. Raymond L. Abma, 1995 Stanford University, Least-Squares Separation of Signals and Noise Using Multidimensional Filters.
47. Jun Ji, 1995 Stanford University, Sequential Seismic Inversion Using Plane Wave Synthesis.
48. David E. Lumley, follows under (IIif).
49. Christine Ecker, 1998 Stanford University, Seismic Characterization of Methane Hydrate Structures.
50. Matthias Schwab, 1998 Stanford University, Enhancement of Discontinuities in seismic 3-D images using a Java estimation library.
51. Nizar Chemingui, 1999 Stanford University, Imaging irregularly sampled 3D prestack data.
52. Sean Crawley, 2000 Stanford University, Seismic trace interpolation with nonstationary prediction-error filters.
53. Robert G. Clapp, 2000 Stanford University, Geologically constrained migration velocity analysis.
54. Sergey Fomel, follows under (IIg).
55. James Rickett, 2001 Stanford University, Spectral factorization of wavefields and wave operators.
56. Antoine Guitton, 2005 Stanford University, Multidimensional seismic noise attenuation.
57. Jesse Lomask, 2006 Stanford University, Seismic volumetric flattening and segmentation.
58. William Curry, 2008 Stanford University, Interpolation with prediction-error filters and training data.

IIa Robert W. Clayton

1981 Stanford University, Wavefield Inversion Methods for Refraction and Reflection Data.

Graduates at California Institute of Technology:

1. John Fawcett, 1984 California Institute of Technology with Herb Keller, I. Three dimensional ray-tracing and ray-inversion in layered media. II. Inverse scattering and curved ray tomography with applications to seismology.
2. Marianne Walck, 1984 California Institute of Technology, Teleseismic array analysis of upper mantle compressional velocity structure.
3. Thomas Hearn, follows under (IIIa).
4. Eugene Humphreys, follows under (IIIb).
5. Ronan Le Bras, 1985 California Institute of Technology, Methods of multiparameter inversion of seismic data using the acoustic and elastic born approximations.
6. John Vidale, follows under (IIIc).
7. John Louie, follows under (IIId).
8. Phyllis Ho, 1987 California Institute of Technology with Hiroo Kanamori, Attenuation tomography. Modelling regional love waves: Imperial Valley to Pasadena.

9. Christof Stork, 1988 California Institute of Technology, Ray trace tomographic velocity analysis of surface seismic reflection data.
10. Hua-Wei Zhou, follows under (IIIe).
11. Olafur Gudmundsson, 1989 California Institute of Technology, Some problems in global tomography: modeling the core-mantle boundary and statistical analysis of travel-time data.
12. J. Huw Davies, follows under (III f).
13. Robert W. Graves, 1990 California Institute of Technology, Modeling seismic wave propagation using paraxial extrapolators.
14. Bruce Worden, 1991 California Institute of Technology, Interactive seismic imaging on a multicomputer and application to the Hosgri fault.
15. Linda Rowan, 1993 California Institute of Technology with Tom Ahrens, Equation of state of molten mid-ocean ridge basalt. Structure of Kilauea volcano.
16. Leo Eisner, 2001 California Institute of Technology, Reciprocity method in seismology.
17. Julie J. Nazareth, 2002 California Institute of Technology with Egill Hauksson, The structure of the crust and distribution of earthquakes in Southern California.
18. William Keller, 2003 California Institute of Technology with Joann Stock, Cenozoic plate tectonic reconstructions and plate boundary processes in the Southwest Pacific.
19. Patricia Persaud, 2003 California Institute of Technology with Joann Stock, Images of early continental breakup in and around the Gulf of California and the role of basal shear in producing wide plate boundaries.
20. Zhimei Yan, 2006 California Institute of Technology, Regional mapping of the crustal structure in Southern California.
21. Nathan Downey, 2008 California Institute of Technology with J. Stock and M. Gurnis, Tectonic history of the Osborn spreading center and dynamic subsidence of the Congo basin.
22. Nathalie Vriend, 2009 California Institute of Technology with M. Hunt and C. Brennen, Booming Sand Dunes.
23. Sonja Spasojevic, 2010 California Institute of Technology with M. Gurnis, Dynamics of long-term sea-level change and vertical motion of continents.
24. Michelle Selvans, 2011 California Institute of Technology with J. Stock and O. Aharonson, Analysis of Sonobuoy data to determine crustal structure of the Adare Trough, Antarctica.
25. YoungHee Kim, follows under (III g).
26. Ting Chen, 2012 California Institute of Technology with N. Lapusta, Part I: Structure of central and southern Mexico from velocity and attenuation tomography; Part II: Physics of small repeating earthquakes.
27. Kristin Phillips-Alonge, 2012 California Institute of Technology, Receiver Function Studies of Southern Peru From Seismic Array Data.

Current students at California Institute of Technology:

1. Steve Skinner (with J. Stock)
2. Vanessa Heckman (with T. Heaton)

3. Sara Dougherty (with D. Helmberger)
4. Yiran Ma
5. Dunzhu Li

Iib Dave Hale

1983 Stanford University, Dip-moveout by Fourier transform.

Graduates at Colorado School of Mines:

1. Yong Ma, 2012 Colorado School of Mines, Waveform-based velocity estimation from reflection seismic data.

Current students at Colorado School of Mines:

1. Simon Luo
2. Xinming Wu
3. Stefan Compton
4. Andrew Munoz

Iic Daniel H. Rothman

1985 Stanford University, Large Near-Surface Anomalies, Seismic Reflection Data, and Simulated Annealing.

Graduates at Massachusetts Institute of Technology:

1. Andrew K. Gunstensen, 1992 Massachusetts Institute of Technology, Lattice-Boltzmann studies of multiphase flow through porous media.
2. John F. Olson, 1996 Massachusetts Institute of Technology, Two-fluid flow in sedimentary rock: complexity, transport, and simulation.
3. Einat Aharonov, 1996 Massachusetts Institute of Technology, Solid-fluid interactions in porous media: processes that form rocks.
4. Olav van Genabeek, 1998 Massachusetts Institute of Technology, Velocity fluctuations in slow flow through porous media.
5. Peter S. Dodds, 2000 Massachusetts Institute of Technology, Geometry of river networks.
6. Davide Stelitano, 2000 Massachusetts Institute of Technology, Elastic interfaces in fluids: lattice-Boltzmann model and applications.
7. Joshua S. Weitz, 2003 Massachusetts Institute of Technology, Generalized contact processes in ecology.
8. Alexander P.P. Petroff, 2011 Massachusetts Institute of Technology, Streams, stromatolites and the geometry of growth.
9. David Forney, 2012 Massachusetts Institute of Technology, Emergent properties of heterogeneous decomposition networks

Current students at Massachusetts Institute of Technology:

1. Christopher Follet
2. Robert Yi

Iid Peter Mora

1987 Stanford University, Elastic Wavefield Inversion.

Graduates at Institut de Physique du Globe de Paris:

1. Dominique Rodriques, 1993 Institut de Physique du Globe de Paris, Simulation de la propagation d'ondes sismiques sur machine massivement parallèle.
2. Dimitri Pissarenko, 1994 Institut de Physique du Globe de Paris, Modélisation de la friction et de l'instabilité sismique.
3. Bertrand Maillot, 1994 Institut de Physique du Globe de Paris, Construction d'un modèle semi-microscopique d'ondes élastiques basé sur les méthodes de Boltzmann sur réseaux.
4. Lian-Jie Huang, 1994 Institut de Physique du Globe de Paris, Approches microscopiques de la propagation des ondes dans les milieux complexes.
5. Frédéric Donze, 1994 Institut de Physique du Globe de Paris, Modélisation numérique de la déformation des roches comportement fragile par une méthode d'éléments discrets.
6. Bruno Riollot, 1997 University Paris-Diderot, Simulation numérique de la propagation d'ondes sismiques en milieu fracturé.

Graduates at The University of Queensland:

1. David Place 1999 The University of Queensland, A refined lattice solid model to simulate earthquakes and localisation phenomena using parallel computers.
2. Steffen Abe, 2002 The University of Queensland, Investigation of the influence of different micro-physics on the dynamic behaviour of faults using the lattice solid model.
3. Dion Kent Weatherley, 2002 Investigations of automaton earthquake models: implications for seismicity and earthquake forecasting.
4. Can Yin, 2005 The University of Queensland, Exploring the underlying mechanism of load/unload response ratio theory and its application to earthquake prediction.

Ile Biondo L. Biondi

1990 Stanford University, Seismic Velocity Estimation by Beam Stack.

Graduates at Stanford University:

1. Morgan P. Brown, 2004 Stanford University, Least-squares joint imaging of multiples and primaries.
2. Paul Sava, follows under (IIIh).
3. Brad Artman, 2006 Stanford University, Passive seismic imaging.
4. Daniel A. Rosales Roche, 2006 Stanford University, Imaging of converted-wave Ocean-bottom seismic data.
5. Gabriel F. Alvarez, 2007 Stanford University, Attenuation of multiples in image space.
6. Guojian Shan, 2008 Stanford University, Imaging of steep reflectors in anisotropic media by wavefield extrapolation.
7. Alejandro A. Valenciano, 2008 Stanford University, Imaging by wave-equation inversion.
8. Jeff Shragge, follows under (IIIi).
9. Claudio Guerra, 2010 Stanford University, Migration-velocity analysis using image-space generalized wavefields

10. Yaxun Tang, 2011 Stanford University, Imaging and velocity analysis by target-oriented wavefield inversion.
11. Gboyega Ayeni, 2011 Stanford University, Time-lapse seismic imaging by linearized joint inversion.

Current students at Stanford University:

1. Adam Halpert
2. Xukai Shen
3. Sjoerd de Ridder
4. Mandy Wong
5. Yunyue Li
6. Yang Zhang
7. Ohad Barak
8. Chris Leader
9. Ali Almomin
10. Yi Shen
11. Noha Farghal
12. Musa Maharramov
13. Jason Chang
14. Taylor Dahlke
15. (Huy Le - masters)

IIf David E. Lumley

1995 Stanford University, Seismic Time-Lapse Monitoring of Subsurface Fluid Flow. Graduates at Memorial University at Newfoundland:

1. Richard Wright, 2005, 4D Seismic Analysis of the Hubernia Oil Field, Grand Banks, Canada.

Graduates at the University of Western Australia:

1. Matt Saul, 2013 University of Western Australia with (IIf) and (IIIi), 4D seismic data analysis of reservoir gas movement.

Current students at the University of Western Australia:

1. Lisa Gavin, co-advised with (IIIi).
2. James Deeks, co-advised with (IIIi).
3. Mohammad Emami Niri
4. Rafael de Souza

IIg Sergey Fomel

2001 Stanford University, Three-dimensional seismic data regularization.

Graduates at The University of Texas at Austin:

1. Hesam Kazemeini, 2009 Uppsala University with C. Juhlin, Seismic Investigations at the Ketzin CO₂ injection site, Germany: Applications to subsurface feature mapping and CO₂ seismic response modeling.
2. William Burnett, 2011 The University of Texas at Austin, Multiazimuth velocity analysis using velocity-independent seismic imaging.

3. Xiaolei Song, 2012 The University of Texas at Austin, Application of Fourier finite differences and lowrank approximation method for seismic modeling and subsalt imaging.

Current students at The University of Texas at Austin:

1. Vladimir Bashkardin
2. Siwei Li
3. Parvaneh Karimi
4. Yangkang Chen
5. Junzhe Sun

IIIa Thomas M. Hearn

1985 California Institute of Technology, Crustal structure in Southern California from array data. Graduates at New Mexico State University:

1. Anca Rosca, 2000 New Mexico State University, Upper mantle structure beneath Nevada and southern California.

IIIb Eugene D. Humphreys

1985 California Institute of Technology with Brad Hager, Studies of the crust-mantle system beneath Southern California.

Graduates at the University of Oregon:

1. Alberto E. Patiño-Douce, 1990 University of Oregon under (IIIg) and A. Dana Johnson, Ultrametamorphism and anatexis of the continental crust: an experimental and theoretical study.
2. Francois Saucier, 1991 University of Oregon, Studies of plate-mantle dynamics at continental margins.
3. Glenn P. Biasi, 1994 University of Oregon, The streaming potential method applied to a low gradient hydrologic environment along the Mojave River, San Bernardino County, California.
4. Kenneth Dueker, 1994 University of Oregon, Origin of western United States upper mantle seismic heterogeneity.
5. Xiaohua Peng, 1995 University of Oregon, Crustal velocity structure inferred from waveform modeling of teleseismic body waves: studies of northern Nevada and the eastern Snake River plain.
6. Randy L. Palmer, 1997 University of Oregon, Studies of the kinematics and dynamics of southern California and northern Baja, Mexico.
7. Elizabeth H. Hearn, 1998 University of Oregon, Numerical models of lithosphere deformation : inferring rheology and structure from limited surface observations.
8. Mark A. Hemphill-Haley, 1999 University of Oregon, Multi-scaled analyses of contemporary crustal deformation of western North America.
9. William C. Hammond, 2000 University of Oregon, Dynamics, flow and melt content of the Southern East Pacific Rise upper mantle from teleseismic tomography.
10. Derek L. Schutt, 2000 University of Oregon, Aspects of upper mantle structure in the Yellowstone Swell, Wyoming Craton, and Yavapai Province.
11. Haiying Gao, 2011 University of Oregon, The seismic structures of the U.S. Pacific Northwest and the scaling and recurrence patterns of slow slip events.

12. Brandon Schmandt, 2011 University of Oregon, Seismic Structure of the Western U.S. Mantle and Its Relation to Regional Tectonic and Magmatic Activity.

Current students at the University of Oregon:

1. David Adams
2. Noah Fay

IIIc John Vidale

1986 California Institute of Technology with Don Helmberger, Application of two-dimensional finite-difference wave simulation to earthquakes, earth structure, and seismic hazard.

Graduates at the University of California, Santa Cruz:

1. Ornella Bonamassa, 1995 University of California, Santa Cruz, Analysis of site effect and directional resonances and their relevance to seismic hazard.

Graduates at the University of California, Los Angeles:

1. Elizabeth Cochran, 2005 University of California, Los Angeles, Earthquake rupture initiation and fault structure : I. triggering of earthquakes by Earth tides : II. seismic anisotropy near the Hector Mine rupture : III. post-seismic displacements observed with InSAR.
2. Steven E. Persh, 2002 University of California, Los Angeles, Seismic investigations of core-mantle boundary structure and source properties of deep-focus earthquakes.

Graduates at the University of Washington:

1. Andrew Delorey, 2010 University of Washington, Predicting Strong Motions for Seismic Hazard Assessments in Seattle, Washington.
2. Abhijit Ghosh, 2011 University of Washington, Imaging slow earthquakes in Cascadia using seismic arrays.

Current students at the University of Washington:

1. Alicia Hotovek
2. Kate Allstadt

IIIId John N. Louie

1987 California Institute of Technology under (IIa), Seismic reflection experiments imaging the physical nature of crustal structures in southern California.

Graduates at the University of Nevada, Reno:

1. Sathish Kumar Pullammanappallil C., 1994 University of Nevada, Reno, Nonlinear optimization to estimate velocities and image reflectors from multi-offset seismic data.
2. Sergio Chavez-Prez, 1997 University of Nevada, Reno, Enhanced imaging of fault zones in southern California from seismic reflection studies.
3. Abu M. Asad, 1998 University of Nevada, Reno, Linearized and nonlinear travel time tomography for upper crustal velocity structure of the western Great Basin.
4. Robert E. Abbott, 2001 University of Nevada, Reno, Geophysical constraints on seismic hazard and tectonics in the western Basin and Range.
5. James B. Scott, 2007 University of Nevada, Reno, Seismic noise in the shallow subsurface: methods for using it in earthquake hazard assessment.

6. Donghong Pei, 2007 University of Nevada, Reno, Modeling and inversion of dispersion curves of surface waves in shallow site investigations.

Current students at the University of Nevada, Reno:

1. Gretchen Schmauder

IIIe Hua-Wei Zhou

1989 California Institute of Technology with Don Anderson, Travel time tomographic studies of seismic structures around subducted lithospheric slabs.

Current students while at the University of Houston:

1. Curtis A. Link, 1993 University of Houston, Crosshole seism. analysis for reservoir characterization & lithology indication.
2. Hongwei Wang, 1994 University of Houston, Analysis of ISC P-wave data and applications to the inference of velocity structure in the mantle.
3. Stephen T. T. Ha, 1994 University of Houston, Benefiting from directional phase-encoded wavefield: Experimental and theoretical implementation of Neidell-dolphin concept.
4. Genmeng Chen, 1995 University of Houston, Seismic modeling and imaging of heterogeneous media.
5. Marcos Guimaraes, 1998 University of Houston, Phys. model study of seis. acquisition and processing of vertical cable data.
6. Oong Koo Youn, 1998 University of Houston, AVO modeling and depth imaging with multiples.
7. Mohammed Al-Otaibi, 2002 University of Houston, Thin-bed AVO.
8. Khalid Al-Rufaii, 2002 University of Houston, Seismic tomography in areas associated with complex near-surface structures
9. Warren Duncan, 2005 University of Houston, Integrated geophysical study of Vinton Dome, LA.
10. Mike P. Thornton, 2006 University of Houston, Depth imaging of crustal scale seismic reflection surveys in Southern California.
11. Li Li, 2007 University of Houston, Mapping 3D crustal velocities of S. California by deformable layer tomography.
12. Alex Zhao, 2007 University of Houston, Classification detection of reservoir fluids with rock physics constraints.
13. Hongmei Cao, 2008 University of Houston, Reflection attenuation tomo. and ray count weighted multi-scale tomography.
14. Hui Liu, 2010 Texas Tech University, Multiscale deformable layer tomography for near-surface velocity model building.
15. Fan Jiang, 2010 Texas Tech University, Waveform modeling, migration and tomographic analysis of seismic anisotropy.
16. Aifei Bian, 2011 China University of Geosciences at Wuhan, Theory and application of full waveform inversion in reflection seismology.
17. Bao Mei, 2011 China University of Geosciences at Wuhan, Research on crustal structure from tomography in the Three Gorges reservoir head area .

18. Zhihui Zou, 2012 Texas Tech University, A seismologic study of the Three-Gorges Reservoir (TGR) region, China.

Current students at the University of Houston:

1. Chris Gantela

Current students at Texas Tech University:

1. Fang Yuan
2. Pan Deng

III f J. Huw Davies

1989 California Institute of Technology under (IIa) and Dave Stevenson, Some problems in mantle structure and dynamics; Part 1. Inversion for depth variation of spectra of mantle compressional and shear velocity heterogeneity. Part 2. Physical model of source region of subduction zone volcanism.

Graduates at University of Liverpool:

1. Andrea Rowland, 1997 University of Liverpool, Numerical modelling of subduction zone magmatism.
2. Mark Rhodes, 1998 University of Liverpool, Mantle seismic tomography using P-wave travel times and a priori velocity models.
3. Carlos E. Izarra Teran, 2001 University of Liverpool under (III f) and xxx, The gravity anomaly of the subducted Nazca plate over the central Andes.

Graduates at Cardiff University:

1. David Oldham, Cardiff University, On the possibility of layered mantle convection - numerical simulation in a spherical geometry.
2. D. Rhodri Davies, follows under (IVa).
3. Martin Wolstencroft, Cardiff University, Understanding the thermal evolution of Earth.
4. Peter J. Webb, 2012 Cardiff University, Mantle circulation models: constraining mantle dynamics, testing plate motion history and calculating dynamic topography.

Current students at Cardiff University:

1. Rebekah Lawton
2. Matthew Price

III g YoungHee Kim

2011 California Institute of Technology with J. Jackson, Seismic Properties of the Subduction System in Mexico.

Current students at Seoul National University:

1. Eunyong Kim

III h Paul C. Sava

2004 Stanford University, Migration and velocity analysis by wavefield extrapolation.

Graduates at Colorado School of Mines:

1. Jia Yan, 2010 Colorado School of Mines, Elastic anisotropic wavefield imaging.

2. Tongning Yang, 2013 Colorado School of Mines, Wavefield-based velocity model building using extended images.

Current Students at Colorado School of Mines:

1. Francesco Perrone
2. Esteban Diaz
3. Natalya Patrikeeva
4. Yuting Duan

IIIi Jeffrey Shragge

2009 Stanford University, Wave-equation migration in generalized coordinates.

Graduates at the University of Western Australia:

1. Matt Saul, 2013 University of Western Australia with (IIIe) and (IIf), 4D seismic data analysis of reservoir gas movement.

Current students at the University of Western Australia:

1. Lisa Gavin, co-advised with (IIf).
2. James Deeks, co-advised with (IIf).

IVa Rhodri Davies

2007, Cardiff University and Swansea University under (IIIi), Ken Morgan, Oubay Hassan and Perumal Nithiarasu, Applying Multi-Resolution Numerical Methods to Geodynamics.

Current students at Imperial College London:

1. Giuseppe Le-Voci

ACKNOWLEDGEMENTS

I would like to thank Bob Clapp, Biondo Biondi and of course Jon Claerbout, for helping me find so many of Jon's PhD students. Many people from all over the world have been helpful and enthusiastic in replying to my inquiries. In no particular order and likely incomplete: Robert Clayton, Dave Hale, Paul Sava, Sergey Fomel, David Lumley, Jeff Shragge, Kim YoungHee, John Louie, J. Huw Davies, John Vidale, Eugene Humphreys, Thomas Hearn, Hua-Wei Zhou, Jun Ji, Abhijit Ghosh, Rhodri Davies and Thomas Hearn.