# JEAN-PAUL AMPUERO

## ABOUT

Jean-Paul (aka Pablo) is a Senior Researcher at IRD (French National Research Institute for Sustainable Development) and Excellence Chair at Université Côte d'Azur; formerly Professor at the Caltech Seismolab. He received his Ph.D. degree from Université Paris VII and IPGP (Institut de Physique du Globe de Paris).

Ampuero's research aims at understanding earthquake processes by integrating theory, computation and seismological observations. He has obtained fundamental results on earthquake nucleation and on the role of off-fault plasticity, fault zone damage, stress heterogeneity and bimaterial contrast on earthquake rupture. He has developed a spectral element method for dynamic rupture simulation and a high-resolution back-projection technique for high-frequency rupture imaging, which enabled the characterization of the complex rupture patterns of recent large earthquakes.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Jim has been extremely influential on my research, ever since I met him in Paris in the late 90s, where Renata and Jim were regular visitors. I was then a graduate student working on earthquake nucleation, and Jim introduced many of us in France to rate-and-state friction.

While many in my generation were busy seizing the opportunities of the expanding computational power, some of us remained also very keen of pen-and-paper theoretical work. For that, I often find inspiration in Jim's body of work on fracture and earthquake mechanics. Also, re-reading his older papers is always a good sanity check: sometimes I realize I am re-discovering the wheel; Jim already did it 40 years ago!

As a testament to Jim's longstanding influence, the field of theoretical fracture mechanics continues to produce fundamental insights on natural and induced seismicity, from the tiny tremors to the mega-earthquakes, which are essential to understand how our planet works.

Congratulations, Jim!

# LESLIE BANKS-SILLS

## ABOUT

Leslie is Professor Emerita in the School of Mechanical Engineering at Tel Aviv University in Israel. She is co-director of the Dreszer Fracture Mechanics Laboratory. She received her undergraduate degree in Mathematics from Queens College, New York, an M.Sc. degree at the University of Michigan in Applied Mechanics and a Ph.D. degree in Engineering at Harvard University under the guidance of Bernard Budiansky. She carried out post-doctoral studies at Brown University with Jim Rice.

Leslie's research group currently works in the area of failure of composite laminate materials. Use is made of analytical, numerical and experimental techniques of applied mechanics to study delaminations.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Jim Rice has been an inspiration to all people in Applied Mechanics. He has so many ground breaking papers. To mention three of them: one on the J-integral in 1968, one on the weight function method in 1972 and one on interface fracture in 1988. I am sure others can be mentioned which have also influenced the direction of our field. It is hard to imagine fracture mechanics without the J-integral, the weight function method and a clear direction for interface fracture mechanics.

I was fortunate to work with Jim during my post-doctoral studies at Brown. As I said in my book on Interface Fracture and Delaminations in Composite Material: 'I stood on the shoulders of giants'.

I reminisce on our meeting in Belgrade, Serbia in 2018 where the European Structural Integrity Society (ESIS) at ECF22 awarded Jim the prestigious Griffith Medal. I had the pleasure of giving it to him. He gave a lecture on the J-integral at our conference and received a standing ovation. Of course we missed Renata.

Jim showing the Griffith Medal to the audience.

# JOHN BASSANI

## ABOUT

John is the Richard H. and S. L. Gable Professor of Mechanical Engineering at the University of Pennsylvania. He received his undergraduate degree in Mechanical Engineering and Masters in Mechanics from Lehigh University and his Ph.D. in Engineering Sciences from Harvard University under the guidance of Prof. John Hutchinson (when Jim Rice was at Brown University).

John's research group works on problems in plasticity, fracture, interface mechanics and computational mechanics of engineered and bio-materials. Recent projects include patterning interfaces to control direct adhesion and the rupture of fibrin hydrogels, the structural component of blood clots, to characterize toughness and better the rupture of thrombi. Throughout, Jim has had a lasting impact on John's research.

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As a PhD student, I first read Jim's 1971 paper on the thermodynamics of inelastic constitutive relations, which continues to inspire me. I met Jim shortly after that when working with Frank McClintock on creep fracture problems. We were building on Jim's seminal 1980 paper with Herman Riedel that led to several exciting meetings among the four of us in Providence and Cambridge. Jim's approach to fracture, plasticity and strain localization – and his advice – have continuously guided me. Thank you Jim!

Jim tells a wonderful story about the start of his career in the undergraduate program led by his PhD advisor, Ferdinand Beer. Below is a photo of mechanicians with Lehigh roots taken at the Hutchinson-Rice 60th Birthday Celebration – *Solid Mechanics at the Turn of the Millennium*: (left to right) Pedro Ponte, Joachim Grenestedt, Jim Rice, Paul Paris, Ferdinand Beer, John Hutchinson, Fazil Erdogan, and me.

I have many wonderful memories of times together with Jim and Renata that are highlights of my career. Best wishes to both of you!

# THORSTEN BECKER

## ABOUT

Thorsten holds the Shell Foundation Distinguished Chair in Geophysics at the Jackson School of Geosciences at UT Austin. His main research interests are in geodynamics and seismology. He studied fault mechanics with Jim and Renata, supporting a lasting interest in the physics of earthquake interactions.

Thorsten currently chairs the Standing Committee on Solid Earth Geophysics, and is a member of the Board of Earth Sciences and Resources, at the National Academy of Sciences.

He has a Diplom in Physics from Frankfurt University, a Ph.D. in Geophysics from Harvard, and was a post-doc at Scripps, UC San Diego.

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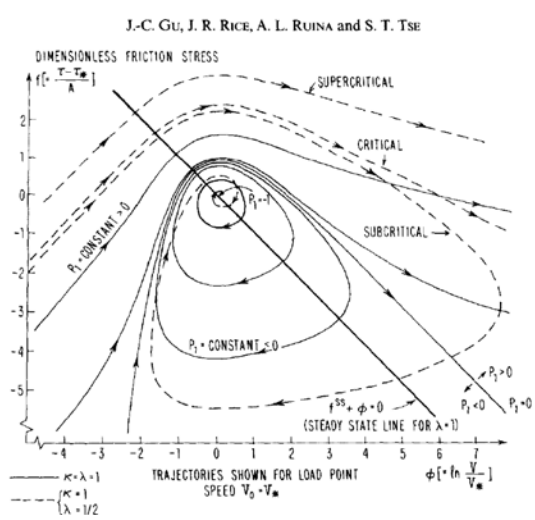
## THOUGHTS, RECOLLECTIONS, GREETINGS

Discussing science with Renata and Jim and their group was one of the most fun academic activities I was ever part of. They made me feel at home at Harvard where I felt like a fraud, and kindly invited me into their home. Having Jim drive us students to an MIT class in the morning remains a terrifying memory (what if I'm asked a question?!), though I do have fond memories of very nice dinners at their book-filled Cambridge house. I also recall discussing the evils of smoking, bringing a very European perspective to the table. I try to be more polite these days, but still do my best to emulate their academic and personal support and openness.

All the best, cheers to many more years of discovery!




I In lieu of a picture of Jim, I'm including one of my favorite plots, this one from Gu et al. (J. Mech. Phys. Sol., 1984) illustrating how the critical stiffness determines spring-slider behavior. This and related work reminded me to think of systems as moving about in a phase space.

# GLENN BELTZ

## ABOUT

Glenn is a Professor of Mechanical Engineering at the University of California, Santa Barbara. He received his undergraduate degree in Materials Science from Carnegie Mellon University and his M.S. and Ph.D. degrees in Engineering Sciences from Harvard University, under the guidance of Jim Rice.

Glenn continued to work on problems involving dislocations and fracture in collaboration with several Materials faculty at UCSB, focusing on high performance composite materials and electronic films. He currently serves UCSB as the Associate Dean for Undergraduate Studies in the College of Engineering, where he directs the Office of Undergraduate Studies. His responsibilities include recruitment of undergraduate students, accreditation, and most importantly, providing advising and other academic support to current undergraduate students.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Hello, Jim and Renata! I look forward to seeing you at the event in June. I am grateful to the organizers for persevering through the pandemic to make an event happen.

So many things about you have stuck with me and made me a better person. The way I write, the way I teach, the way I interact with people in the academic community all have discernible positive influences from you. As you know, I felt a calling to become more involved in undergraduate education at my home university. Even though I don't work with equations and think about cracks and dislocations on a daily basis, your approachability, your unassuming manner, and faith in who you worked with were help make an impact on new generations of young engineering students. Finally, I'll be forever grateful that you loaned me your car for a summer! ☺

# MARTINE BEN AMAR

## ABOUT

Martine is a Professor of Physics at Sorbonne Université and at Ecole Normale Supérieure in Paris. She received her undergraduate degree in Ecole Normale Supérieure in Atomic Physics. She graduated in Atomic Spectroscopy and on the Many-Body Problem in Quantum Physics in Université d'Orsay

Martine's research group works in the areas of nonlinear elasticity and biomechanics of living species: embryogenesis and cancerogenesis.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

I was very lucky to meet Jim during one of his stays in Ecole Normale in Paris and during the year I spent in MIT (2000). We begun a successful collaboration about the famous J-Integral applied to interfacial flows. Yet at this period I was fascinated by exact results and it seems so simple to apply. I also remember the very enlighting classes and seminars he gave during his visits.

Jim and Renata, I wish you a very happy life in future. Hope to see you again, in Paris, Boston or somewhere else

Congratulations and happy birthday.

# YEHUDA BEN-ZION

## ABOUT

Yehuda Ben-Zion is a Professor of Earth Sciences at the University of Southern California and the Director of the Southern California Earthquake Center. He received a B.Sc. in physics and geology from the Hebrew University of Jerusalem in 1982 and a Ph.D. in geophysics from the University of Southern California in 1990. Ben-Zion was a postdoctoral fellow in 1991-1993 and a Research Associate in 1994-1995 with JRR at Harvard University.

Ben-Zion's research is focused on physics of earthquakes and faults using a variety of theoretical tools (many of which he learned from JRR) and observations. Current interests include localization of deformation, seismic imaging of fault zones, earthquake source properties, detection of small events, dynamic ruptures, damage rheology, and spatio-temporal seismicity patterns.

Ben-Zion published eight papers with JRR, including a 1993 paper with Jim and Renata.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

I would like to express my highest appreciation and gratitude to Jim and Renata for a formative learning experience and long friendship. I was highly fortunate to be tutored by "big J" on fracture mechanics, friction and related topics in mechanics of solids (with involvement of fluids). Jim's phenomenal contributions to science & engineering, and exemplary work standards, dedication, and generosity to people and organizations are remarkable and inspiring. Renata has been a great companion for many discussions not only on science but also on music, food, and other topics. My wife, little son (back in the days) and I enjoyed numerous dinners with Jim and Renata at their home and ours. The picture below is from a dinner at our home in Nov 2015.

Congratulations Jim on your 80th birthday and best wishes to you and Renata for the coming years!

# GREG BEROZA

## ABOUT

Greg is an observational earthquake seismologist who develops techniques for analyzing seismograms to understand how earthquakes work and to help quantify the hazards they pose. Since 2007 he has been first Deputy-Director then Co-Director of the Southern California Earthquake Center (SCEC), which means he coordinates the core SCEC research program. Since 2013 he has also been Co-Director of the Stanford Center for Induced and Triggered Seismicity. His current research includes using ambient field measurements for ground motion prediction, developing machine-learning methods for earthquake detection and characterization, and understanding the systematics of induced, slow, and intermediate-depth earthquakes.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

I have known Jim and Renata since I was a grad student at MIT. I visited Harvard for seminars, but only got to know them when I took their class on Earthquake Source Mechanics. Many students who attended those lectures went on to become prominent scientists. That class was critical to my development, I continue to draw on the insights from those lectures in my work, and I still have the notes. I also have several recollections to share.

It was a treat to watch Jim derive the complete elastodynamic Green's function without notes. The problem sets were challenging and insightful. In one we were asked to derive the Sato and Hirasawa solution for the far-field pulse shape. The insight I gleaned from that concerned the source factors that contribute to, and can be inferred from, seismic waves. In another homework we were asked to derive the stress field surrounding a crack tip. I unwisely did it in Cartesian coordinates and grinded through pages of equations before finally arriving at the answer. In grading my homework, Jim elegantly derived the solution in polar coordinates in only a handful of lines. The insight I gleaned from that was that I was not cut out to be a theoretician. Finally, I remember that Jim and Renata brought bottles of wine for the last day of class. I can't remember what the occasion was –presentation of final projects? but it was a nice gesture and we enjoyed it.

Let me take this opportunity to thank you so much for everything you've done.

# HARSHA BHAT

## ABOUT

Harsha S. Bhat is Research Scientist with CNRS, France based out of Ecole Normale Supérieure in Paris. He is currently leading the 'Faults and Earthquakes' team at the Laboratoire de Géologie, ENS.

After obtaining his civil engineering degree in 2001 in India he moved to USA to do his PhD with Jim and Renata at Harvard University. He then continued his postdoctoral work at USC and Caltech under the supervision of Charlie Sammis and Ares Rosakis. On a whim he then applied for a position in France and moved to Paris in 2012 because why not? He now calls himself Indo-Franco-American with a classical British up brining.

Harsha actively works at the interface between solid mechanics and earthquake source physics. His research focuses on the hierarchical nature of fault and fracture networks and their associated multi-scale dynamics.

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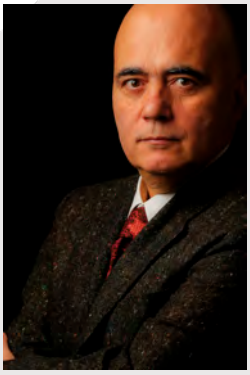
## THOUGHTS, RECOLLECTIONS, GREETINGS

Dear Jim and Renata,

Last year, as I was writing my Habilitation thesis, I spent a lot of time reflecting about the twenty happy years of knowing you. You gave a kid from a small town in India the chance to pursue his passion to learn. You nourished, guided and encouraged this passion with the care and love shown by my parents. I thus say without exaggeration that you are my American parents. I now simply follow your model with my students.

You have been outstanding human beings in my life and in your twilight years I hope you celebrate the positivity you have put out into this world. This celebration is but a mere facet of your extraordinary selves.

Thank you very much!



# DAVIDE BIGONI

## ABOUT

Davide is Professor of Solid and Structural Mechanics at the university of Trento. He received his undergraduate degree in Civil Engineering and his Ph.D. degree in Mechanics of Structures from the University of Bologna, under the guidance of Prof. Michele Capurso and Prof. Tomasz Hueckel.

Davide's research group works in the areas of instability of solids and structures, wave propagation and metamaterials, fracture mechanics and homogenization.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Dear Jim and Dear Renata,

I met Jim for the first time by reading his fantastic papers. I loved his problems, his calculations, his approach to mechanics, and his writing style.

It was therefore a great privilege for me, my family, and my students to meet Jim and Renata in person and learn from them about science, art, and life!

Together with my family and my students we would like to wish Jim a very happy birthday and we are looking forward to continue learning from you for many more years to come

Davide, Rita, Fred, Michela

This is a little memory of the last time we met. It was in Trento, spring 2019.

# EMILY BRODSKY

## ABOUT

Emily Brodsky is an observational earthquake physicist at the University of California, Santa Cruz. She uses a variety of observational techniques to study faulting and other catastrophic failures including hydrogeology, temperature monitoring, structural geology, granular flow experiments and seismology. Emily narrowly missed taking a class from Jim at Harvard when she was an undergraduate, much to her regret. She got to know him later and has enjoyed her professional interactions with him for 20 years.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

My multi-decade conversation with Jim really got started with something of a bang at the initial SCEC Fault and Rock Mechanics workshop. At the time, I was discussing my work on fault lubrication. Jim objected to my appeal to a granular flow as the lubricant under the relevant pressures. We had a vigorous conversation on the topic which ended up launching me down an experimental pathway. There is a direct line between my current work showing that granular flows have an unexpectedly fluid regime at high shear rates and his question years ago.

Many thanks for that solid shove in the direction of rigor. The line of inquiry opened a totally new pathway.  You made an experimentalist out of me and more careful scientist. I will always be grateful.

# ANDREW BUNGER

## ABOUT

Andrew Bunger is an Associate Professor in the University of Pittsburgh's Department of Civil and Environmental Engineering where he holds the RK Mellon Faculty Fellowship in Energy. He joined the University of Pittsburgh in 2013 after spending 10 years in Melbourne, Australia working in the Geomechanics Group within the Commonwealth Scientific and Industrial Research Organisation (CSIRO). Prior to that, he received his PhD in Geological Engineering from the University of Minnesota.

Andrew is director of the University of Pittsburgh Hydraulic Fracturing and Geomechanics Laboratory. Research focuses on experimental, theoretical, and simulation-based investigations of rock deformation and breakage. Specific interests include the mechanics of hydraulic fractures, coupled fluid-shale interaction, emplacement dynamics of magma-driven dykes and sills, and development of novel materials for wellbore cementing and plugging.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Traveling in Australia with Jim in 2013, just one month after my family relocated back to the US after 10 years in Australia, is one of the best memories in my career. Jim had accepted invitations that involved giving talks in both Brisbane and Melbourne. We spent several days riding in airplanes and cars, eating hotel breakfasts, and visiting my former research lab at CSIRO. In every phase of the trip, Jim set the example of a gracious colleague and imminent scholar who has drive, curiosity, and humility.

On our visit to Melbourne, I showed Jim a set of experiments we had completed over the previous months, my last work at CSIRO. These experiments showed that rocks continue to generate acoustic emission from the vicinity of the fracture surfaces for days following tensile breakage. I will never forget Jim's genuine enthusiasm and exclamation, "That is so INTERESTING!"

That genuine interest in collaboration, scholarly discussion, and encouragement of younger academics is what I most appreciate. Over the coming years I visited Harvard several times and Jim also visited Pitt, and it can never be overstated how much it meant to me as an Assistant Professor to receive Jim's feedback and encouragement.

# MASSIMO COCCO

## ABOUT

Massimo Cocco is a physicist and Director of Research at the Istituto Nazionale di Geofisica e Vulcanologia INGV (Rome). He has been the coordinator of the EPOS (European Plate Observing System) Research Infrastructure, the ESFRI infrastructure aiming at the integration of data and services for solid Earth Science (www.epos-eu.org). He has been granted by the ERC of the Synergy grant FEAR (Fault Activation and Earthquake Rupture) aiming at integrating fault mechanics, seismology and numerical modeling across scales: from laboratory to deep underground experiments to natural earthquakes.

His research interests are focused on the physics of earthquakes and faults, more specifically on earthquake dynamics, fault frictional properties and fault interaction, seismicity patterns and earthquake occurrence. He is interested in both theoretical studies and observational research. He has interests in all aspects of the mechanics of earthquake and faulting from observations of natural faults through geophysical and geological measurements to experimental faults at the laboratory scale.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

This is a great opportunity to send my greetings to Jim and Renata, renewing the pleasure of having known, met and collaborated with them. I knew Jim Rice by reading and studying his pioneering articles on fracture mechanics and fracture energy. I therefore had the chance to collaborate with him on a couple of papers and to discuss with him while we were both visiting scientists in Paris. Discussing science far away from your office is in my opinion a favorable condition to keep open mind, feeding enthusiasm and scientific interests.

The motivation and the origin of the 2002 paper with Jim is at least curious and I am happy to recollect this story. The assumption that pore pressure is proportional to normal stress leads to the widely used concept of an effective friction coefficient. I noticed in the existing literature that authors were referring to a manuscript wrote by Jim in 1992 to justify the dependence of pore pressure changes from normal stress changes. However, the Jim's 1992 paper was saying something different and I asked him to discuss the origin of this scaling. This was the start of my journey with Jim in pore pressure and poroelasticity effects in Coulomb stress analysis. Digging into a problem foster curiosity and serendipity. It has been a great professional and human experience which I have the pleasure of sharing with Jim and Renata on this occasion.

# ALAIN COCHARD

About

Alain is Associate professor at EOST, Strasbourg (France).

He received his undergraduate degree in Physics at Université Paris XI and his PhD in Geophysics at IPG Paris. He has been a postdoctoral fellow at Harvard and Paris in 1995-2000.

Alain's interest are computational mechanics, earthquake source processes, friction, and rotational motions.

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## Thoughts, recollections, greetings

I will remain eternally grateful to Jim and Renata for these great years.

It is hard to discriminate between the exciting scientific part (unparalleled so far), and all the kindness. They even took care of my social life (OK, mostly Renata).

I also will not forget that they lent me their house (I apologize again for the time I ate all the cookies).

My daughters were too young to remember about dinners in Paris with uncle Jim and aunt Renata, but it is still how we refer to them nowadays.

In fact, there is not a single day during which I do not think about either of them -- but then, when I think about one, I think about the other!

# ERIC DUNHAM

## ABOUT

Eric is an Associate Professor in the Department of Geophysics at Stanford University and an affiliated faculty member with Stanford's Institute for Computational and Mathematical Engineering. He studies natural hazards like earthquakes, volcanoes, and tsunamis through computational mechanics-based modeling. He received his PhD in Physics from the University of California, Santa Barbara, in 2005, with support of a National Defense Science and Engineering Graduate Fellowship, before moving to Harvard University as a Reginald A. Daly postdoctoral fellow and a Lecturer on Applied Math. He is an Alfred P. Sloan Fellow in Physics and a recipient of the National Science Foundation CAREER award and the Stanford School of Earth Sciences Excellence in Teaching Award. He teaches classes at Stanford on earthquake processes, wave propagation in solids and fluids, and scientific computing.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Best wishes on your 80th birthday! Jim, I am so grateful to you for your mentoring and guidance over my career. By your example, you showed us how extraordinary excellence in science can be combined with humility and courtesy. I believe this has shaped our field into a supportive and collegial community, where people are generous in giving credit to others and looking for the best in every talk or paper. Tou taught me the delights of applied mechanics and the importance of attention to detail. You have an incredible ability to reduce a complex natural system or phenomenon, like earthquakes, into a tractable mechanics-based mathematical model that you use to gain insight and understanding. It was a pleasure to learn about shear heating, thermal pressurization, poroelastic effects, and plasticity in earthquake rupture propagation with you as a postdoc at Harvard. I thank you also for balancing your guidance and collaboration with your patience in giving me the freedom to pursue my own projects, like rupture propagation and wave radiation from rough faults. I recall fondly our dinners in Cambridge, and later in San Francisco at AGU, with Renata and other members of the Rice group.

## ABOUT

Ahmed is an Associate Professor of Civil Engineering, and a Donald-Biggar-Willet faculty fellow at the University of Illinois Urbana Champaign. He holds a BSc in Civil Engineering and an MSc in Structural Engineering both from Cairo University. He completed an MSc in Applied Mechanics and PhD in Civil Engineering from Caltech under the guidance of Professor Thomas Heaton and co-mentorship of Professor Nadia Lapusta. Before joining UIUC, Ahmed was a postdoc in the department of Physics at UC Santa Barbara where he worked with Professors Jean Carlson and James S. Langer.

Ahmed's research group focuses on problems in theoretical and applied mechanics of solids, with special emphasis on fracture, deformation and wave propagation problems as they arise in geophysics, soft materials, and material design. He is a co-leader of Computational Sciences Group at SCEC, a fellow of National Center of Supercomputing Applications, and a faculty affiliate of Department of Physics at UIUC.

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# AHMED ELBANNA

## THOUGHTS, RECOLLECTIONS, GREETINGS

It is hard to find enough words to describe what I feel towards Jim. As a student of both Mechanics and Geophysics, Jim's direct influence on my career is ginormous. Jim's brilliance created new fields and transformed others, but his kind and caring personality is heartwarming. I have enjoyed many conversations with Jim throughout the years. He would listen carefully, encourage passionately, and share ideas or critiques that are always to the point. I am always grateful for Jim for giving me time to meet with him at Harvard whenever I am in Boston for a conference or a seminar. It was memorable to host Jim during his 2016 visit to UIUC where we spent more time together and chatted about life, family, and science. Thank you, Jim, for all your support and encouragement and may you continue to inspire us for many years to come.

With Jim and Nadia at the Engineering Mechanics Institute Meeting (MIT, 2018)

# BILL ELLSWORTH

## ABOUT

Bill is a Professor in the Department of Geophysics at Stanford University and Co-Director of the Stanford Center for Induced and Triggered Seismicity (SCITS). Before coming to Stanford in 2015 he was with the U. S. Geological Survey in Menlo Park, CA.

His research focuses on active faults, the earthquakes they generate and the physics of the earthquake source. A major goal of his work is to improve our knowledge of earthquake hazards through the application of physics-based understanding of the underlying processes, and the transfer of scientific understanding of the hazard and risk to the public, businesses, policymakers, and government agencies. As Co-Director of SCITS he leads multi-disciplinary studies into the causes and consequences of anthropogenic earthquakes around the world.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

If I had to pick just one example from the many ways that Jim has shaped the course of earthquake science, it wouldn't be one of his papers or talks of which there are many to choose from. Rather, as a key advisor, his insights, encouragement, and support of the SAFOD team were critical as we planned and drilled through the San Andreas Fault. It took a decade from start to finish and Jim was with us all the way. When we brought a piece of the fault to the surface and needed to interpret it, sure enough, the "dry Rice" model was the one still standing. Thank you Jim for being with us on the journey.

Jim (yellow jacket) explains why the pseudotachylyte took a 90-degree turn to the geologists and seismologists on the 2005 Chapman Conference field trip along the coast of Maine.

# MATHEUS FERNANDES

## ABOUT

Matt is a Senior Data Scientist at Fidelity Management and Research. He received his bachelor's degree from Case Western Reserve University in Mechanical Engineering under the guidance of Prof. Vikas Prakash and Prof. Maurice Adams. He received his Masters of Engineering in Engineering Science at Harvard working with Prof. Rice. Matt received a Masters of Science in Computational Science and Engineering and a PhD in Applied Mathematics at Harvard working with Prof. Katia Bertoldi.

As a master's student working with Prof. Rice, Matt's research focused on modeling ice sheet deformation under supraglacial lakes and modeling the deformation of Röthlisberger channels in ice-stream shear margins. As a PhD student working with Prof. Bertoldi, Matt transitioned to working on biologically inspired structures and metamaterials.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

I will never forget the first time when I walked into Jim's Pierce Hall office. Filled with books and knowledge that transcended various fields of study, it was an inspiration to see how one can carry over knowledge from one field to another. Jim's endless multidisciplinary expertise has always been complemented by his humility and humbleness.

I reminisce spending time with Jim and Renata and have fond memories of the lovely dinners at Gran Gusto and Trattoria in Cambridge. You both have made a huge difference in my life and have served an inspiration to myself and many others!

Alaina and I wish you the very best and a Happy Birthday! Thank you so much for everything you both have done!

Peabody Terrace after dinner on May 22, 2016

# YURI FIALKO

## ABOUT

Yuri Fialko is a Professor of Geophysics at the Scripps Institution of Oceanography, University of California San Diego. He received his Bachelor's degree in Mathematical Geophysics from Kyiv University in Ukraine and his Ph.D. degree in Geosciences from Princeton University.

Yuri's research interests include deformation of the Earth's crust due to earthquake faults, magmatic sources, and other manifestations of active tectonics. Yuri uses space geodetic observations (primarily from Interferometric Synthetic Aperture Radar and Global Navigation Satellite Systems), numerical models, and laboratory experiments to understand how the Earth responds to various kinds of natural and anthropogenic forcing. He is a Director of a Joint Degree Program in Geophysics between UCSD and SDSU.

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https://igppweb.ucsd.edu/~fialko

## THOUGHTS, RECOLLECTIONS, GREETINGS

I first met Jim in the mid 1990s when I was a graduate student; Jim visited to give a departmental seminar. I was quite curious about the speaker's relationship to "J.R. Rice" whose article we read in one of my undergraduate classes. I gathered that a person who wrote a Treatise article before I was born could not possibly be this youngish energetic speaker. Twenty years later, Jim gave a talk at a Symposium we held at UCSD. After the talk, a student came to me and asked: "Is this the same James Rice whose (1968) paper we discussed in our seminar?!?" It then occurred to me that Jim's impact on generations of students is a recurrent relation of order n, where n>>1. Happy Anniversary Jim!

# HUAJIAN GAO

## ABOUT

Huajian Gao is currently a Distinguished University Professor at Nanyang Technological University and Scientific Director of the Institute of High Performance Computing in Singapore. He received his Ph.D degree from Harvard in 1988 under the supervision and mentoring of Prof. Rice. Huajian served on the faculty of Stanford from 1988-2002, where he was promoted to Associate Professor with tenure in 1994 and to Full Professor in 2000. He then went on to become a Director at the Max Planck Institute for Metals Research from 2001-2006, and the Walter H. Annenberg Professor of Engineering at Brown from 2006-2019.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Throughout my life, I have known Jim as the most creative and most celebrated Scientist in the fields of Mechanics and Geophysics. Those of us who are fortunate enough to count Jim and Renata as teachers and friends appreciate how much richer our lives have become because of them.

Dear Jim: I am most humbled to be your student, and to have known you both personally and professionally. Congratulations on your 80th birthday; wishing you and Renata live a healthy and happy life for many years to come!

Jim, Renata, Joan and Huajian, Paris, June 11, 2016.

# PHILIPPE H. GEUBELLE

## ABOUT

Philippe is the Bliss Professor of Aerospace Engineering and the Executive Associate Dean of the Grainger College of Engineering at the University of Illinois at Urbana-Champaign (UIUC). Originally from Belgium, he got his PhD in Aeronautics at Caltech in 1993. After a postdoc in Jim Rice's group at Harvard, he joined the University of Illinois in January 1995.

Philippe's research group focuses on the theoretical and computational analysis of a variety of topics including the multiscale analysis and design of materials, manufacturing of composite materials, and fracture mechanics. He is an active member of the Autonomous Materials Systems Team located at the UIUC Beckman Institute, whose research activities include self-healing materials, microvascular composites, and new manufacturing of composites using frontal polymerization.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

I joined Jim's group as a NATO postdoc in November 1993 and had the pleasure to work with him and his students until December 1994. During these 13 months, I learned a lot from Jim on how to run a research group. There is no doubt that working with Jim helped me a lot when I started my academic career at the U. of Illinois. By attending the research meetings with his research group, I saw how he always set the bar high for his students but helped every one of them reach that high bar with patience, kindness, and encouragement.

I truly enjoyed my weekly technical meetings with Jim. I used to prepare these meetings carefully, summarizing my research progress on a few sheets of paper. Every week, I was truly amazed to see how quickly he 'caught up' with me and started to lead the conversation to the next steps and potential extensions of the project. I don't think I have ever met someone with such an innate sense of mechanics.

Happy 80$^{th}$ birthday, Jim.

# YVES GUEGUEN

## ABOUT

Yves Guéguen has been Professor of Geophysics at Ecole Normale Supérieure, Paris, from 1996 to 2020.

His scientific contributions have been concerned with Rock Physics and Mechanics: mechanics of mantle rocks deformation, role of fluids in the mechanical behaviour of the crust, mechanical properties of porous/cracked rocks. Important issues related to his investigations are those of crustal mechanics (elastic properties of rocks, damage and localisation), natural hydrocarbons reservoirs (poroelasticity), underground storage.

Yves Guéguen has been the head of the ENS Department of Earth and Atmospheric Sciences (1996-2003). He has been the Deputy Director of ENS for Sciences (2003-2006). He has been in charge of many national and international research programs. He promoted a program of Euroconferences in Rock Physics and Mechanics that has been active since 1998.

**Jim Rice at Ecole Normale Supérieure**

1999-2000: These years were when Jim was Professor at ENS thanks to the special program of the "Blaise Pascal chairs".

I asked Jim to teach many classes during this year and, at the end, was a little confused to have asked him so much. He was very kind and told me that, yes, he did teach a lot, but that year in Paris had been one of the best ones for him!

The impact of his classes has been a fruitful one and produced long-term effects. Solid mechanics is now part of the ongoing research in the "Laboratoire de Géologie" in at least three directions. "Nanoearthquakes" have been experimentally investigated by Alexandre Schubnel and his group, with beautiful results on supershear crack velocity and phase changes instabilities. Jérôme Fortin and his group focused on dispersion/attenuation, unraveling how much cracks are important to understand fluids effects in porous rocks. All these experiments have been made possible through five triaxial cells (there was no triaxial cell when Jim came in 1999). A third research direction is the result of the fortunate decision of Harsha Bhat, a former student of Jim, to settle in the Laboratoire de Géologie. Thanks to him, theoretical research on the physics of earthquakes is also present.

Today, Alexandre Schubnel is the head of the "Laboratoire de Géologie de l'ENS". He attended Jim's classes in 1999/2000, and asked me to recall how much supporting Jim was, in particular with students and young scientists.

Jim came back many times to visit ENS. Certainly, the fact that he enjoyed Paris did help! We were used to see him often, so that it was as if he became a member of the Laboratory!

# RUTH HARRIS

## ABOUT

Ruth is an ST senior scientist at the U.S. Geological Survey. She leads the 30-scientists USGS project that produces the USGS's real-time aftershock probabilities, investigates subduction zones and tsunami sources, operates SAFOD, and includes the USGS's outstanding rock mechanics researchers and laboratories. Her research focus is earthquake hazards. Current interests include the seismogenesis of creeping faults, earthquake triggering, and dynamic rupture simulations of real and scenario large earthquakes and ground shaking in complex settings involving multiple faults and heterogeneous rock properties. Along with Bob Simpson, she is the originator of the term 'stress shadow' now commonly used to define where earthquakes should not occur.

Ruth is a longtime leader in the Southern California Earthquake Center (SCEC), and has also served in numerous leadership roles in the Seismological Society of America (SSA), including as president.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Hello Jim and Renata!

I am very happy to participate in your celebration. I have many fond memories of talking with and learning from you, over the years. You have both been big supporters of me and my work and I have always valued this greatly.

Jim, I especially remember the year when you visited Stanford. This timing coincided with the year when I was also at Stanford as a youngish NSF visiting professor. You helped me with the equations for my paper with Steve Day on the effects of low-velocity zones on dynamic rupture propagation. You cheered me and my work forward at other times too, and I really appreciate it.

Renata, I especially remember the 1997 SCEC workshop on stress triggers and shadows at the USGS in Menlo Park. You and Charlie Sammis recruited me to lead an overview volume, and this motivated me to produce the well-received 1998 JGR special issue on stress triggers, stress shadows, and implications for seismic hazard. The introductory review article has become my most cited work. I thank you for your encouragement and always believing in me.

Jim and Renata, you have a huge difference to so many of us. You are outstanding mentors and have helped us achieve more than we knew was possible. Thank you very much!

# YONGGANG HUANG

## ABOUT

Yonggang is the inaugural Jan and Marcia Achenbach Professor of Mechanical Engineering and Civil and Environmental Engineering at Northwestern University. He received his B.S. degree in Mechanics from Peking University and his S.M. and Ph.D. degrees in Engineering Sciences from Harvard University, under the guidance of Prof. John Hutchinson. He was a postdoctoral fellow at Harvard University, under the guidance of Profs. Jim Rice and Bernie Budiansky.

Yonggang's research group works in the areas of mechanics of stretchable electronics, and deterministic 3D assembly.

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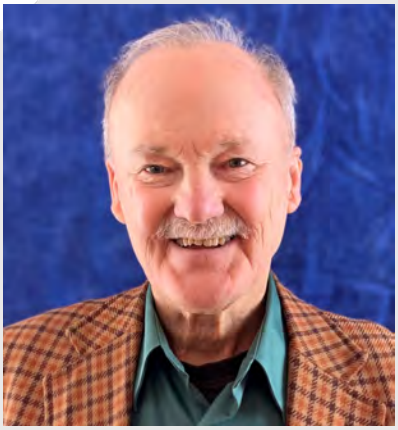
## THOUGHTS, RECOLLECTIONS, GREETINGS

After receiving Ph.D. from Harvard University in 1990 (advised by Prof. John Hutchinson), I did one-year postdoc under the guidance of Profs. Jim Rice and Bernie Budiansky. I took the course Fracture Mechanics twice, once with Jim and the other with John, and learned a lot from their excellent teachings. These experiences benefited my own teaching, as evidenced by the teaching and undergraduate advising awards I received, including the University of Arizona (1993 for being the most supportive junior faculty member), University of Illinois at Urbana-Champaign (2003, 2004, 2005, 2006 and 2007 for teaching excellence, and 2007 for excellence in undergraduate advising) and Northwestern University (2016, 2018 and 2020 for teaching excellence). I am incredibly fortunate to have such great teachers, advisors, and mentors.



# JOHN HUTCHINSON

## ABOUT

John is one of Jim Rice's mechanics colleagues at Harvard. He is the Abbott and James Lawrence Professor of Engineering Emeritus. His research interests are drawn broadly from solid mechanics, engineering materials and structures. His main current efforts are focused on shell stability, instability phenomena in soft materials and small-scale plasticity.

## CONTACT

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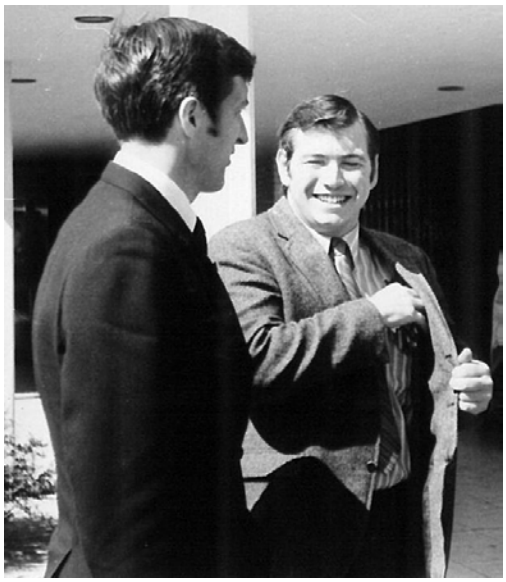
## THOUGHTS, RECOLLECTIONS, GREETINGS

John's close encounters with Jim go back to their undergraduate days in the late 1950's at Lehigh University when both were enrolled in the newly formed Department of Engineering Mechanics. Their paths may have crossed, but, if so, it did not register with either because young Jim was a sophomore when John graduated. Since then their paths have not only crossed but intertwined.

Jim is the father of nonlinear fracture mechanics. Several years after publishing his foundational crack-tip plasticity solutions and the J-integral paper, he was invited to give a seminar at KTH in Stockholm by Janne Carlsson pictured with Jim below. The man who showed up give the seminar was not recognized at first, being far too young to be a father of anything. Many more stories can be told.



# NOBUKI KAME

## ABOUT

Nobuki is an associate professor at Earthquake Research Institute, the University of Tokyo, Japan. He received his undergraduate degree in geophysics from Kyoto University and his doctoral degree of science in geophysics from the University of Tokyo. He joined the group of Professor James R. Rice and Doctor Renata Dmowska as a visiting scientist and spent happy two years from October 2000 to September 2002. He shared the days with the group members Nadia, Ranjith, Koji, Yajing, and Harsha.

Nobuki works in the area of earthquake source physics with the development of earthquake dynamic rupture simulation methods. He currently participates in a research group of pre-P earthquake gravity seismology, which opened a new observation window for an earthquake source.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Dear Jim and Renata,

Jim's sincerity and Renata's heartwarming talk were an ideal combination for the promotion of my research at Harvard. Thank you so much for your concern and friendship. I always remember beautiful days with you. Photos remind me of various things in detail; Jim's convincing handwriting to explain his research ideas; Renata was so familiar with my preference to climbing mountains and often introduced me as a summiteer of the Aconcagua. I hope to see you in Cambridge again!

Jim's office
August 2002

Revisit
December 2018

# YOSHI KANEKO

## ABOUT

Yoshi is an Associate Professor at Kyoto University at the Department of Geophysics. His research focuses on understanding earthquake source processes and their relation to crustal deformation. Before joining Kyoto University in 2020, he was a senior research seismologist at GNS Science, New Zealand for 7 years. He conducted postdoctoral research at Scripps Institution of Oceanography (UC San Diego) and Woods Hole Oceanographic institution. In 2009, he completed his PhD in Geophysics at the Seismological Laboratory at California Institute of Technology in Pasadena, California, USA.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Dear Jim and Renata,

I am really proud to be one of Jim's academic grandchildren. Jim's seminal papers on earthquake cycle simulations triggered my interest within seismology, which led me to where I am today. I have learned from my PhD advisor, Nadia Lapusta, about your outstanding mentorship, ethics and attitude towards research. What you have done has helped me whenever I encounter difficult decisions to make during my work or student mentorship. I am also grateful to Jim and Renata for their encouragement and support on my research.

I am very happy to participate in this special celebration event. Looking forward to seeing you at the symposium!

Best wishes,

Yoshi

# KYUNG-SUK KIM

## ABOUT

Kyung-Suk (KS) Kim, a Professor of Engineering at Brown University received his Ph.D. (1980) in Solid Mechanics from Brown, and taught in the Theoretical and Applied Mechanics Department, University of Illinois-Champaign for nine years until returning to Brown in 1989. He has also held visiting faculty positions at Harvard University (1987-1988 and 2002), Cambridge University, U.K. (1996), UCSB (1997), and Northwestern University (2013).

His research interests are in scale-bridging mechanics, and nano and micromechanics of solids. Through his research on dynamic properties of solids, adhesion and friction, ruga mechanics of soft materials and stability of nanostructures, he has invented numerous new scientific instruments including various interferometers, and analytical methods.


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## THOUGHTS, RECOLLECTIONS, GREETINGS

Jim Rice is not only the top theoretician in mechanics in our time but also the most caring educator and mentor as a warm person. Although I am an experimentalist, Jim influenced me the most in my career through his teaching at the graduate school and research collaboration during my sabbatical. I took three graduate courses ranging from random vibrations to fracture mechanics during my graduate study at Brown, 1976-79. During my sabbatical from Illinois to Harvard, 1987-88, I learned the singular perturbation analysis of a running crack front from Jim through research collaboration. Of course, beyond direct interactions, Jim's other publications always have guided my research in plasticity, fracture, friction, and deformation stability of solids in broad ranges of length and time scales. Happy Birthday, Jim!

Discussion on modeling 2D wrinkling instabilities of thin films on a soft substrate during a symposium at Cachan, France, in 2014.

Helmut Kirchner is professor emeritus of Multimaterials at the University of Paris.

# HELMUT KIRCHNER

The first time I met Jim Rice in the early 80's at a conference in the US. I asked him a question on weight functions, and he gave me a remarkable answer. There must have been something unforgettable about the meeting. When fifteen years later we ran into each other in the Luxembourg RER station in Paris, we recognized each other immediately and remembered our first names. It was one of Jim's many visits to the Ecole Normale. In the following years, whenever Renata and Jim came to Paris, and they liked coming here, we had dinner together and became good friends and enjoyed going together to museums and wine fairs. I have always admired Jim's scientific work and the way he talked about it. He encouraged my work on snow and I profited a lot from our discussions. Ad multos annos, dear Jim! And a bientot in Paris!

# YANN KLINGER

## ABOUT

Yann Klinger is a CNRS senior research at Institut de Physique du Globe de Paris, France, where he chairs the group of Tectonics. Starting as a geophysical engineer, he got his PhD in source seismology and active tectonics from Univ. of Strasbourg, under the guidance of L. Dorbath and J.P. Avouac. He spent two years as a post-doctoral fellow in Caltech doing paleoseismology, before being hired at CNRS in 2001.

His main research focuses on earthquake cycle. He studies modern earthquakes through a combination of fieldwork, seismology, and space geodesy. He has also been very active in paleoseismology and earthquake geology, working many continental fault systems across the planet. He always tries to bring his observations into a broader earthquake mechanics perspective.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Spending one year (2007-2008) as a visiting scientist in Jim's group at Harvard will always remains among the highlights of my professional life. It has been tough sometime as the distance between a field-observation person like me, and Jim's theoretical world is sometime overwhelming, but it has also been a unique opportunity to explore new avenues that framed part of my further work during the following years. Renata's key role in gluing together these different aspects of earthquake science should not be underestimated as well! Beyond our professional interactions, Jim and Renata should also be celebrated for their personal infinite kindness, which we, as a family, benefited a lot when visiting in Cambridge, but also through our long lasting relation during all these years, including during their numerous visits in Paris.

# JEFFREY KYSAR

## ABOUT

Jeff earned his Ph.D. in Jim's group in 1998. After a postdoc at Brown, he joined the Department of Mechanical Engineering at Columbia University in 2001 and has served as Chair of his department since 2014. In 2017 he received a joint appointment in the Department of Otolaryngology – Head & Neck Surgery.

Jeff continues to have research interests in single crystal plasticity. In addition, he works in the field of two-dimensional materials such as graphene and molybdenum disulfide. More recently, Jeff has developed collaborations with surgeons. One collaboration is to design, manufacture and deploy surgical tools for medical intervention in the cochlea. Another is to design, fabricate and test a prosthetic heart valve for babies born with certain heart defects, whereby the prosthesis can be expanded via balloon catheter dilation repeatedly as the child grows to adulthood.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

My most sincere congratulations to Jim on this occasion of his 80th birthday. Jim's direct contributions to the field of mechanics have been profound and will stand the test of time. Equally as profound, though, are his contributions to those around him, and in particular to his students. His continual focus on fundamentals and rigor applied to important and impactful problems has set the standard in our field since he first emerged on the scene. We have all learned from his insight and tried to emulate his example – and this has raised the level of us all.

I am tremendously grateful to Renata and Jim for their genuine kindness to me and my family during our time in Cambridge and afterward.

In 1998 when I gave Jim a copy of my thesis, he placed it on his bookshelf with those of his previous students and commented that there was probably just enough shelf space remaining for him to continue in research until he turned seventy. I am delighted that he has been able to find the additional shelf space!

# VALERE LAMBERT

## ABOUT

Valère is an NSF postdoctoral fellow in the Earth and Planetary Sciences department at the University of California, Santa Cruz. He received his undergraduate degree in Physics and his Ph.D. in Geophysics, with a minor in Mechanical Engineering, from the California Institute of Technology, under the guidance of Prof. Nadia Lapusta.

Valère's research utilizes methods in computational mechanics to examine the relationship between laboratory rock studies, geophysical field observations and the physics of earthquake source processes and aseismic fault motion. He is interested in the nature of fracture and frictional sliding, both in terms of developing theoretical and laboratory-based descriptions of failure processes and their implications for natural hazards.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Dear Jim,
Your papers and course notes have been the foundation of my doctoral studies. As a graduate student, I recall hearing endless stories about the brilliant and extraordinarily kind Jim Rice. It was such an immense pleasure to experience the truth of these stories myself. Your attendance at my virtual thesis defense was such a thrilling and welcome surprise.

Congratulations on your 80th birthday and for all of your achievements! Thank you for your immense contributions to the field and for serving as such a remarkable role model. It is an honor to be your academic grandchild and I look forward to continuing to learn from you.
-Valère

Symposium on Fatigue and Fracture in memory of Paul C. Paris, Society of Engineering Sciences Meeting, October 2019: Valère Lambert, Nadia Lapusta, Jim Rice (L to R)

# JIM LANGER

Jim Langer received his Ph.D. under the supervision of Rudolph Peierls at the University of Birmingham, England in 1958. He then returned to Carnegie Tech (now Carnegie Mellon University) where he remained until 1982, when he moved to the University of California, Santa Barbara to join the Institute for Theoretical Physics.

As distractions from his main interests in materials theory, Jim has served as Director of the ITP, President of the American Physical Society, Vice President of the National Academy of Sciences, and inaugural editor of the Annual Review of Condensed Matter Physics.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Dear Jim,

I remember with pleasure our intense debates about fracture theory and earthquake dynamics starting about twenty-five years ago. Mostly, these were email discussions. Judging from the frequency of long messages in my files, and the fact that both of us had other major commitments in those years, we must both have spent lots of time grappling with those scientific issues.

Perhaps you know that I've come back to that field recently. I've written a series of utterly heretical papers about dislocations and fracture toughness in crystals. Based on past experience, I'm sure you disagree with me about these ideas; but I haven't lost hope that you'll tell me why.

With very best regards,

Jim L.

# NADIA LAPUSTA

## ABOUT

Nadia is the Hanson Professor of Mechanical Engineering and Geophysics at the California Institute of Technology. She received her undergraduate degree in Mechanics and Applied Mathematics from Kyiv Taras Shevchenko National University in Ukraine, and her Ph.D. degree in Engineering Sciences from Harvard University, under the guidance of Prof. Jim Rice and much support from Dr. Renata Dmowska.

Nadia's research group works in the areas of computational mechanics of geomaterials, earthquake source processes, fundamentals of friction and fracture, and solid-fluid interactions.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Working with Jim was a life-changing experience, not only because of his brilliance and amazing insight, but also because of his gracious attitude and kindness. It was incredibly rewarding to share in Jim's research process that seamlessly combined just the right amounts of theoretical rigor and empirical facts to produce ground-breaking models and findings. It was equally inspiring to see Jim's genuine respect and care for his students and other junior scientists, paired with patience, open mindedness, and joyful willingness to be proven wrong in our joint quest for the scientific truth.

Trying to keep up with Jim was exhilarating and stressful at the same time, and it would be impossible without Renata's generosity and thoughtful advice, not to mention fun stories and delightful music tapes.

Jim and Renata, thank you for everything you have taught so many of us, for being inspiring role models, and for your continuing friendship!

Jim, Renata, and several of Jim's students, Caltech, 2011.

# JEAN-BAPTISTE LEBLOND

## ABOUT

Jean-Baptiste is a "Professeur de Classe Exceptionnelle" at Sorbonne Université, Faculté des Sciences et Ingénierie (formerly Université Pierre Marie Curie), Paris, France. He studied at Ecole Normale Supérieure and Université Pierre et Marie Curie, where he received his Ph.D. degree.

Jean-Baptiste's scientific interests include 2D and 3D brittle fracture mechanics, ductile rupture of metals, transformation plasticity of steels and alloys, numerical simulation of welding and other thermomechanical processes, advanced numerical methods including nodal-integration-based finite element methods, and nonlinear problems of coupled diffusion/reaction in solids. He is the author of about 140 papers in scientific journals and has supervised about 30 Ph.D. theses. He is a member of the French Academies of Sciences and Technology.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Although I never was a student of Jim, I simply cannot say how much I owe him, scientifically and personally. During my career it seemed to me that almost every time I embarked on some new scientific topic in solid mechanics, there was a fundamental paper of his on the subject. Retrospectively, it seems to me that a major part of my works was inspired from his seminal ideas, and simply consisted of trying to fully explore their consequences. I do not regret it!

Two photos taken at the end of the induction ceremony in Paris for his election as « Doctor Honoris Causa » of Sorbonne Université. Left photo, from left to right: my wife Ariane, Gilles Perrin (a former Ph.D. student of mine and postdoc of Jim), Jim, Ms. Cabannes (a friend of mine) and Véronique Lazarus (a former Ph.D. student of mine). Right photo, from left to right: Jim, myself, Ariane. Phew, it was hot that day with the official costume and hat!

# VICTOR LI

## ABOUT

Victor is the James R. Rice Distinguished University Professor of Engineering at the University of Michigan. He received all his degrees from Brown University, including a PhD under the guidance of Prof. Rice.

Victor's research group focuses on low carbon ductile concrete material for resilient, durable, and sustainable built environment. He directs the Center for Low Carbon Built Environment at the University of Michigan.

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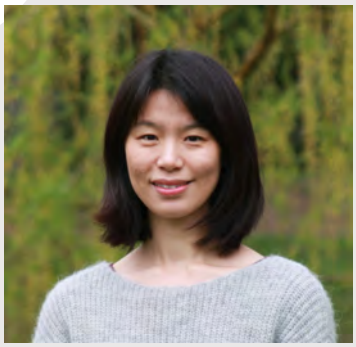
## THOUGHTS, RECOLLECTIONS, GREETINGS

Professor James R. Rice has a remarkable career that has significantly impacted multiple fields, including my own field of study in construction materials and climate change. But what I admire most is the generosity he continually bestowed upon his students, even long after they have established their own careers. I know because I am one of his beneficiaries. Whatever little success I have in my research and teaching, I am deeply aware that it has derived from the enormous influence Jim has on me. I am mighty proud to call Jim my teacher, my mentor, and my friend. I would like to take this opportunity to wish the very best for Jim and Renata. They will always be in the deepest of my heart.

Jim visited me at the University of Michigan in 2018. Accompanying us is UM President Mark Schlissel.



# YAJING LIU

## ABOUT

Yajing is an Associate Professor of Geophysics at McGill University. She received her undergraduate degree in Geophysics from Peking University, China, and her Ph.D. in Earth and Planetary Sciences from Harvard University under the guidance of Prof. Jim Rice. She was a Harry Hess postdoctoral fellow at Princeton University and an Assistant Scientist at Woods Hole Oceanographic Institution before joining McGill.

Yajing's research group works on the source processes of slow and fast earthquakes of natural and anthropogenic origins using observational seismology and numerical modeling. She currently holds a Canada Research Chair position in earthquake seismology.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Dear Jim and Renata,

Thank you both so much for the encouragement and support through all the years, at and beyond Harvard. Jim, I was enormously fortunate to have you as a supervisor and mentor who patiently guided and deeply influenced me in so many ways that I am empowered to pay forward to the younger generation. Renata, subduction zone is my love at first sight, and thank you for sowing that seed in my heart. Miss your warm hugs!

-Yajing

Ferst Award Symposium at Georgia Tech, December 2015 (left to right): Shuman Xia, Ting Zhu, Jim Rice, Yajing Liu, Min Zhou, John Platt, Harsha Bhat

# XANTHIPPI MARKENSCOFF

## ABOUT

Xanthippi is a Distinguished Professor (Recalled) of Mechanical and Aerospace Engineering at the University of California, San Diego. Her area of expertise is the elastodynamics of defects, dislocation dynamics and expanding inclusions, with more recent work on the dynamic Eshelby problem and the deep earthquakes "mystery" as instabilities under very high pressure.

Her Diploma in Civil Engineering is from the National Technical University of Athens, Greece, and the Ph.D. from Princeton University. Her work on dislocation dynamics started with Rod Clifton at Brown University where she has held visiting appointments. She was a Vis. Miller Professor at UC Berkeley, Springer Prof in Mech Engineering at UC Berkeley, Vis. Directeur de Recherche at Ecole Polytechnique, Paris, France, and Vis Fellow at Christ Church College, Oxford University.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

I first met Jim and Renata at the Paris meeting in honor of H.D. Bui (July, 2011). Since then, the encouragement that I have received from Jim on pursuing my work on expanding inclusions and the deep earthquakes has been a driving force for me, in addition to his *J* and *M* integrals! Jim made me believe in myself and that mechanics was a beautiful and eternal world to belong to (he embodied it)!

In June 2012, I organized a Symposium in honor of Rod Clifton on the island of Symi, Greece (the picture taken at my house). Two young mechanicians came from Athens so that they "can tell their future students that they have met Jim Rice"!

# COLIN R. MEYER

## ABOUT

Colin is an applied mathematician who studies how glaciers and ice sheets respond to changes in climate. His research interests also include fluid dynamics, snow and ice mechanics, and icy satellites. Prior to joining Dartmouth, he was a postdoctoral scholar at the University of Oregon. He earned a BS in civil and environmental engineering from the University of California, Berkeley, a Master of Advanced Study for Part III of the Mathematical Tripos from the University of Cambridge, and a PhD in applied mathematics from Harvard University

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## THOUGHTS, RECOLLECTIONS, GREETINGS

I first met Jim at AGU while I was an undergraduate—he came to my poster on particles in turbulence. I was familiar with Jim's work on fracture and the J-integral, so I was excited to hear about his interest in glaciers and turbulence in subglacial channels. We had breakfast together the next day in the fellows' corner and I expressed interest in joining his group at Harvard. With encouragement from Jim, I spent the next year at DAMTP in Cambridge, UK, before starting at Harvard the following Fall. When I arrived, the group was enthralled by ice stream shear margins—John, Jenny, and Thibaut were all working on them! Naturally, I got involved with shear margins as well. A few recollections from my time with Jim at Harvard: Group dinners at Gran Gusto drinking Montepulciano; learning Jim's take on fluid dynamics and geomechanics as a TF; pitching ideas in small areas on the chalkboard behind Jim's desk; joint group meetings with Miaki staring at beach balls; reviewing countless books for Renata; phone calls from Jim to the "bullpen" upstairs. I couldn't help but be inspired by Jim's ability to identify research problems, extract interesting mechanics and geophysics, and focus on a single theme from start to finish. I am grateful to Jim for teaching me about conserved integrals, the hodograph transform, and ice stream shear margins. It was the honor of a lifetime to learn from Jim!

## ABOUT

Alan completed his Ph.D. at Harvard University in 1970 advised by John Hutchinson. He then spent five years in Applied Mathematics at MIT before joining the Division of Engineering at Brown University where he greatly benefitted from having an office near Jim's office. Alan retired from Brown University in 2009 and moved to the University of North Texas. In 2015 he joined Texas A&M University where he is a Professor in the Department of Materials Science and Engineering, holder of the Royce E. Wisenbaker '39 Chair II, and a University Distinguished Professor.

Alan's main research activities involve the computational modeling of deformation and fracture processes in hard materials. His research areas include: ductile fracture by void nucleation, growth and coalescence; modeling plastic deformation of crystalline and amorphous solids at various scales; plastic instabilities; and modeling quasi-static and dynamic crack growth.

## CONTACT

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# ALAN NEEDLEMAN

## THOUGHTS, RECOLLECTIONS, GREETINGS

I am extremely pleased to be able to participate in this celebration of Jim Rice's 80th birthday and career. I had the great pleasure and benefit of being Jim's colleague for six years at Brown before he moved to Harvard. One focus of my research has been the mechanics of porosity evolution in plastic solids, a subject that Jim played a major role in initiating, and about which I learned so much from him. Because we lived near each other, Jim and I would often walk home from the office together. I could get more insight into mechanics issues on those walks than I got during the rest of the day. On occasion, when, for one reason or another, I couldn't be at the office for most of the day, I would go to the office just before the time Jim typically left work so I could walk home with him.

When Renata arrived she added a new dimension to life at Brown through her deep knowledge of and love for literature, music and art, and her enthusiastic sharing of that. In 1996 Wanda and I were at an IUTAM Symposium in Ireland with Jim and Renata that included a trip to a medieval castle. Renata took one look at the well-preserved stone structure and concluded "They haven't had earthquakes here."

Interactions with Jim and Renata continued for Wanda and me after they moved north and we had many lovely times together, often including wonderful dinners. One of the things Wanda and I miss most about leaving New England for Texas is being able to visit regularly with Jim and Renata.

Left to right: Zdenek Bazant, Ares Rosakis, Jim, Yonggang Huang (standing), Alan Needleman, Wanda Needleman, Huajian Gao. October 2011.

Left to right: Jim, Renata, John Hutchinson. August 2014.

# RUŽICA NIKOLIĆ

## ABOUT

Ružica R. Nikolić is a Professor/ Researcher at Research Center, University of Žilina, Slovakia. She was formerly affiliated with Faculty of Mechanical Engineering, University of Kragujevac, Serbia, from where she received the undergraduate degree (Diploma Engineer), as well as the graduate degree of Master of Technical Sciences in Mechanical Engineering and MS and PhD degree in Engineering Sciences from Harvard University, under the guidance of Professor Jim Rice.

Ružica's research interests include Applied mechanics (fracture and structural mechanics) and Material science (properties, processing, new and nano-materials, welding, green-technology in civil engineering).

She is also involved in the area of higher education development, evaluation and accreditation.

She was the Vice-Rector of University of Kragujevac, Serbia and President of Accreditation Commission for Higher Education of Serbia.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Dear Jim and Renata,

I first came to work with you Jim, as a visiting researcher and was lucky to be accepted for graduate studies. What I learned and gained during that time is priceless in all the aspects. Your guidance, patience and devotion helped me to earn a degree, but above all, taught me how to become a scientist. When I wrote a draft for our first common paper, you said: "This is very good and bad. Good for you and me, bad for some other reader".

Renata, you were a friend I could turn to whenever I needed some advice, help, or even a good company for lunch in Chinese or Greek restaurant (where I was silly enough to ask for a "Turkish" coffee).

Thank you guys for the best six years of my life.

Cambridge, 01/12/1989

Caltech, 01/21/ 2011

# HIROYUKI NODA

## ABOUT

Hiroyuki is an associate professor in Disaster Prevention Research Institute in Kyoto University, Japan. He received his undergraduate and master degrees in Geology under the guidance of Prof. Toshihiko Shimamoto, and doctoral degree in Geophysics under the guidance of Prof. Kazuro Hirahara. During the doctoral study, he stayed at Harvard University for about 2 years and carried out the doctoral research under the guidance of Prof. Jim Rice. After acquisition of the doctoral degree, he worked with Nadia Lapusta at Caltech as a post-doc for about 3 years, in JAMSTEC for about 5 years, and then moved to the current position.

Hiroyuki works on mechanical properties and dynamics of faults, by means of laboratory experiments and numerical simulations. He is interested in realistic fault constitutive laws from a viewpoint of structural geology and their consequences in the fault dynamics.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Happy anniversary, Jim and Renata! I'm so happy to have an opportunity to join this wonderful event.

My visit to Harvard from 2005 changed my life drastically. I learned a lot in carrying out my doctoral research and in taking courses Jim offered, struggling with his problem sets. The visit was an invaluable experience that built the base of my theoretical side of academic activities. I deeply thank Jim and the group members. (Below is a view from Pierce Hall then.)

About 10 years ago, I helped Nadia in organizing the 70th anniversary, and realized how much Jim and Renata are loved by their academic family members. I hope another one in 10 years!

# David Oglesby

## About

David Oglesby is a Professor of Geophysics at the University of California, Riverside. He received his BA in Physics at Carleton College and his MA in Physics at the University of California, Santa Barbara. He also received his Ph.D. in Geological Sciences from the University of California, Santa Barbara, under his advisor Ralph Archuleta. He then went on to a postdoc at San Diego State University with Steve Day.

David's research focuses on the physics of the earthquake process. David's research group typically uses numerical fault models to investigate the dynamics of faults with geometrical, frictional, and stress complexity, as well as the resultant earthquake ground motion. He is also interested in the interface between earthquakes and tsunamis. David is the UCR Board member for the Southern California Earthquake Center (SCEC).

## Contact

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## Thoughts, recollections, greetings

Jim and Renata have always been a source of inspiration to me, ever since I made the switch from radio astronomy to seismology while in grad school at UC Santa Barbara. I avidly read Jim's papers, marveling at the way he combined intellectual and analytical rigor with comparisons and validations from data. I also found great inspiration in Renata's work on rooting tsunami generation to more realistic earthquake models. Even when I was a new graduate student, Jim and Renata always had time for me, and always genuinely expressed interest in my work, giving me confidence to go forward in what was at the time a very new, exciting, and somewhat intimidating field for me. Throughout my career they have been a tremendous source of suggestions, compliments, and constructive advice through countless wonderful conversations and email exchanges.

I'll also never forget how Jim and Renata welcomed me with open arms to give a talk at Harvard when I was a junior professor at UC Riverside--they even took my wife Laura and me on a car trip to see the absolutely stunning autumn leaves. I will always treasure Jim and Renata's friendship.

# KURAMA OKUBO

## ABOUT

Kurama is a postdoctoral researcher at National Research Institute for Earth Science and Disaster Resilience (NIED). He received his bachelor's degree from Kyoto University, Japan, and a Ph.D. degree from U. Paris VII - Institut de Physique du Globe de Paris under the supervision of Dr. Yann Klinger, Dr. Esteban Rougier and Dr. Harsha S. Bhat in 2018. He joined in the group of Prof. Marine Denolle at EPS, Harvard University as a postdoctoral fellow. During his stay, he participated in Prof. Rice's weekly group meeting.

His research interest includes the earthquake rupture dynamics, focusing on the coseismic off-fault damage, and the ambient seismic noise interferometry.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

When I first entered the office of Jim, fully filled with books, journals and notes, I was blown away by its magnificent atmosphere of science. I am grateful that Jim gave me helpful feedbacks and future directions.

It was also fruitful that Renata talked on pieces of episodes about people in geophysics, which made me wonder how much it has advanced over decades.

Thank you for all the discussions and encouragement. I wish you the best of health and look forward to seeing you in the symposium.

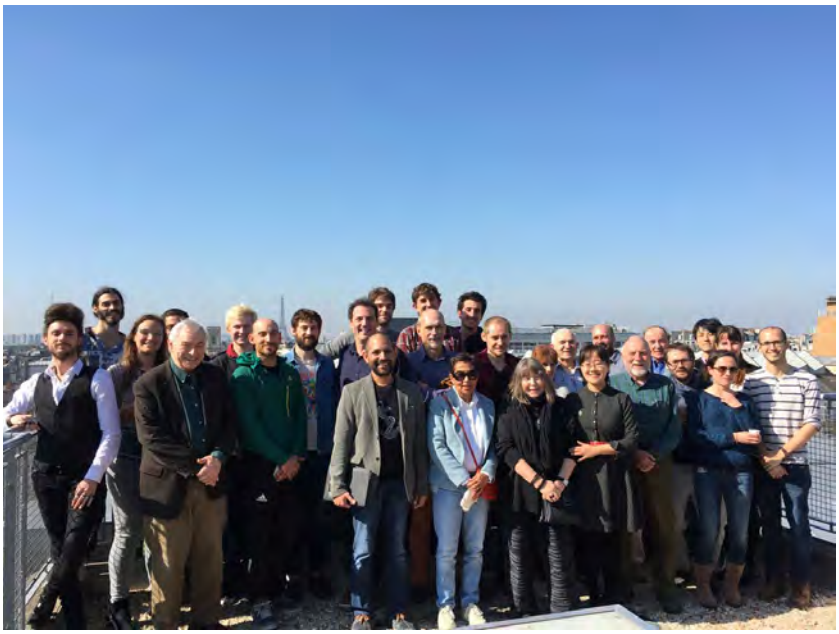

Photo taken at ENS, June 12, 2017

## ABOUT

David is Professor of Mechanical Engineering at the Massachusetts Institute of Technology. He received his undergraduate degree in Engineering Mechanics from the University of Illinois at Urbana-Champaign and his Ph.D. degree in Engineering from Brown University, under the guidance of Prof. Jim Rice.

David has worked in computational and micromechanically-motivated constitutive modeling of inelastic deformation and fracture in broad a range of engineering materials.

## CONTACT

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# DAVID PARKS

## THOUGHTS, RECOLLECTIONS, GREETINGS

It is a pleasure to join colleagues and friends of Jim and Renata in this celebration. There are countless beneficiaries of Jim's vast legacy of fundamental contributions in mechanics, materials science, and geophysics; among them, I am doubly fortunate to have spent formative professional years as his student, and to be a direct recipient of his guidance.

The story-board of a typical weekly progress meeting from those pre-PowerPoint days featured hand-written notes and graphs of data I had extracted from fanfolded computer printouts. Jim would listen attentively, take out a ball-point pen and remark "Perhaps. But maybe another way to think about it is …" Key concepts would be recalled, noted, and potential implications identified and discussed.

With a draft outline for the next meeting in hand, I would leave, buoyed by the progress that "we" had just made. Then the contact high dissipated, first gradually, then rapidly, as I considered more carefully the lacuna between my initial and final perspectives. Still, Jim's wise responses succeeded on both fronts: the research progressed, as did my own professional development. I remain intensely grateful for having had that opportunity.

Over the years, in corresponding meetings with my own students, I have tried to emulate Jim's kind, gracious, and on-point feedback. Did I succeed in doing so?

Perhaps. But maybe another way to think about it is …

# THIBAUT PEROL

## ABOUT

Thibaut Perol is the Director of Engineering at StormForge. He received his B.S. from Ecole Normale Superieure de Paris and M.S. & Ph.D. from Harvard University under the supervision of Jim Rice.

While in academia, Thibaut worked on the thermal structure of ice streams in Antarctica and on applying machine learning to detect and locate earthquakes. He now focuses on using machine learning to reduce the cost of running applications software on servers in the cloud

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

I first met Jim in Paris in 2010. While not familiar with the field of glaciology, he gave me a chance to come work with him at Harvard for a 6 month long internship. 6 months turned into 18 months and, then, into a Ph.D. under his supervision. I will always remember our first meeting in his office, surrounded by books, PhD thesis from his students, and the legendary black board behind Jim's desk. Jim was so humble and kind, he made me feel at home instantly. He gave me 20 pages of handwritten notes about ice stream margins (that I still keep religiously), I rushed back to my office to start working, I was hooked on research. Jim taught me over the years how to identify key problems, how to leverage knowledge from other fields and most importantly the attention to details on every front. I owe Jim and Renata my intellectual curiosity and my passion for collaborative work.

Jim and Renata, thank you for giving me a chance back in 2010 and thanks for always nourishing my passion for learning over the years. Happy birthday Jim!

# GILLES PERRIN

## ABOUT

Gilles is Chief Scientific Officer at Framatome, the French nuclear plant maker.

This includes knowing some science about whole nuclear applications, and I love it.

This includes as well working on Materials and Mechanics, and I love it too: welding, fracture, dynamics, dislocations playing with atoms, all on the industry side and with academics helping.

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## THOUGHTS, RECOLLECTIONS, GREETINGS

It is incredible how often you cross Laplace operator. And how true life lies out of the model.

Teaching is the best way to learning.

I remember that Jim speaks French.

And I remember my splendid year in Harvard with Jim and Renata, when Al Gore was explaining climate change on the campus.

Flamanville 3, le réacteur de génération III+ en France

## ABOUT

Ares is the Theodore von Kármán Professor of Aeronautics and Mechanical Engineering at Caltech. He received his undergraduate degree in Engineering Science from Oxford University and his Ph.D. degree in Solid Mechanics and Structures from Brown University under the guidance of Professor L. B. Freund.

Ares studies dynamic fracture processes in materials and systems of relevance to both the engineering and geophysical lengths and time scales with emphasis on the rupture of interfaces and geological faults. He has had the pleasure of knowing Jim and Renata for at least four decades.

## CONTACT

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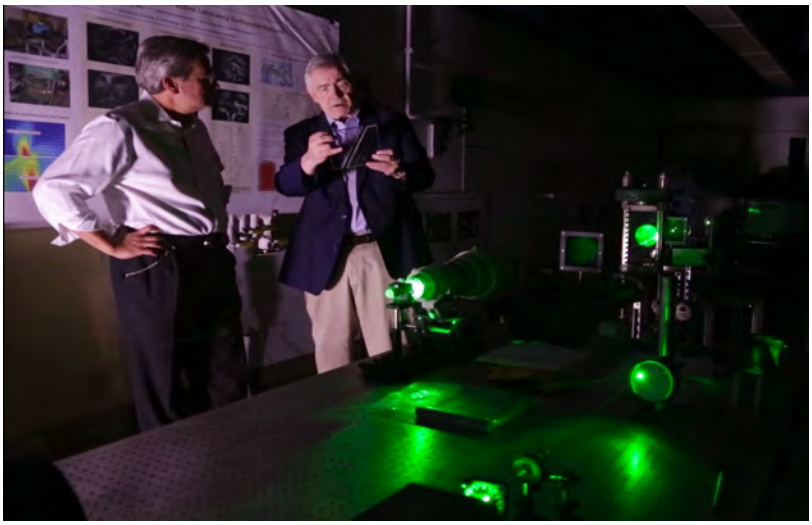
# ARES ROSAKIS

## THOUGHTS, RECOLLECTIONS, GREETINGS

When I was a 23 year old, second year grad student, my advisor Ben Freund insisted that I take Jim's last fracture mechanics class at Brown before he left for Harvard. He was absolutely right. This class exposed me to Jim's brilliant thought process which influenced me throughout my career as an engineer and solid mechanician. Later on, Jim showed me how mechanics of solids can influence science, exposed me to the beauties of earthquake sources mechanics and inspired most of my subsequent work on "Laboratory Earthquakes" and "Supershear Ruptures".

Jim and Renata, I am very grateful to both of you for your warm friendship and for always being the perfect role models for me and generations of others throughout the years. You are the best.

*Happy Birthday Jim!!*



Jim Rice having fun with a Bi-material specimen in my Caltech-Firestone Lab.

# ALLAN RUBIN

## ABOUT

Since 1992 Allan Rubin has been a professor in the Geosciences Department at Princeton University. He received a B.A. in Earth Sciences from Dartmouth College and a Ph.D. in Geology from Stanford University.

Allan has wandered around a bit intellectually. He entered grad school with an interest in metamorphic petrology, which then became igneous petrology, before finally morphing into the mechanics of magma transport, where he first became acquainted with Jim's work in fracture mechanics. Earthquakes in volcanoes then led to a decades-long interest in friction and the mechanics of earthquakes, which he has studied using observation, theory, and (mostly with the assistance of others) experiment.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Meeting Jim and Renata was a life-saver when, as a post-doc at Caltech in 1989, I was unhappy with my official duties and looking for an outlet to keep me scientifically engaged. Jim was visiting the Mechanical Engineering department during a sabbatical. I had learned of Jim's role in the development of fracture mechanics while working on dike propagation at Stanford, and the occasional lunchtime discussion with him was all it took to keep me going. He and Renata (well, I suspect mostly Renata) even tried, with mixed success, to set me up with a nice young seismologist. After moving to Brown for a second post-doc, I was close enough to Jim to wander over to Harvard from time to time to continue discussing rock fracture, as well as the difficulties of finding a permanent job (had I asked you to write letters of recommendation for me? I think so, but my memory's a little fuzzy). Since moving to Princeton our paths have crossed less frequently, but it's a privilege to attend this symposium honoring one of the giants of science and engineering of the last century.

# JOHN RUDNICKI

## ABOUT

John is Professor of Mechanical Engineering and Civil and Environmental Engineering at Northwestern University. He earned his B.S., M.S. and Ph.D. degrees at Brown University under the supervision of Professor Jim Rice. Before moving to Northwestern in 1981, John was a research Fellow in Geophysics at Caltech and Assistant Professor in the Theoretical and Applied Mechanics department at the University of Illinois at Urbana-Champaign.

John's research has been on the inelastic behavior and failure of geological materials. In particular, he has been interested in the development of localized deformation and the effects of coupling between fluid diffusion and deformation with applications to resource recovery, seismic radiation and fault mechanics.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Jim has had an immense influence not just on my research work but on the trajectory of my life. I first met Jim in 1972 as an undergraduate at Brown University when I became the first student in a new concentration on Engineering Mechanics. I stayed at Brown to work with him. Since then I have had many wonderful experiences with him, both intellectual and social. Particularly memorable occasions were presenting him for an honorary degree at Northwestern in 1996 and interviewing him for an INTERPORE Time Capsule in 2019:

https://www.youtube.com/watch?v=udcXE69i3Yc

My very best wishes to Jim and Renate on this celebratory occasion and for the future.

With Jim and Paul Segall at the Newton Institute for Mathematical Sciences, Cambridge, England, October, 2003.

# JEANNE SAUBER

## ABOUT

Jeanne is a geophysicist in the Geodesy and Geodynamics Laboratory at NASA Goddard Space Flight Center. At NASA, she has led research studies using numerical modeling techniques constrained by crustal deformation, gravity change, high-resolution topography, and other data to study the mechanics of subduction zones, to constrain earthquake source processes, and to determine the crust-mantle rheological structure. She has been a science team member on the SRTM, ICESat, GRACE, and GRACE-FO missions and currently she is a member of the study teams for the Mass Change and Surface Deformation and Change satellite missions.

Jeanne earned her Ph.D. in geophysics at MIT, just down the road from Renata and Jim at Harvard. The desire to reap the benefits of learning from the best researchers at both institutions led a group of MIT geophysics graduate students to enroll in an outstanding class offered by Jim and Renata.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Starting with a Harvard course taught by Jim and Renata on the physics of earthquakes, I had the privilege of witnessing world-class excellence in research combined with a highly professional and warm, personable style. Both Renata and Jim expended considerable effort to mentor their students to develop these important traits.

At the Fall AGU in 1997, Renata and Jeanne, organized a session: "Seismotectonics of shallow subduction zones". Following the special session, we invited our colleagues to a pre-planned "Subduction Zone" dinner; only two female geophysicists could get away with such a title in the email dinner invitation. Later, we edited and published a topical volume together that re-established ourselves as professionals with more conventional capabilities in choosing titles: "Seismogenic and tsunamigenic processes in shallow subduction zones."

For a couple of decades, I have always looked forward to meeting Renata and Jim at the Fall AGU This past year with only a virtual AGU, I appreciated more how much Renata and Jim's presence at a meeting advanced all that I admire in professional researchers. *How about a "Subduction Zone" reunion dinner at the Chicago AGU meeting in 2022?*

# ALEKSANDAR SEDMAK

## ABOUT

Aleksandar is Professor of Mechanical Engineering at the University of Belgrade, Serbia. He received his diploma and magister degree in Mechanical Engineering, and his doctoral degree in Mechanics from University of Belgrade, His doctoral thesis was inspired by early works of Prof. Jim Rice.

Aleksandar was visiting professor at Drexel University on several occasions. He was assistant minister for science and technological development in Serbian government (2003-2006) and vice-rector of the University of Belgrade (2006-2009), Since 2006 he is a Director of the Innovation Center of Faculty of Mechanical Engineering in Belgrade. Since 2014 he is vice-president of European Structural Integrity Society (ESIS).

Aleksandar's research group works in the areas of computational fracture mechanics, especially elastic-plastic behavior of cracked welded joints, structural integrity analysis and assessment, micromechanical modelling and biomaterials.

## CONTACT

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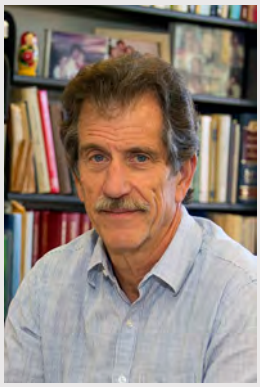
## THOUGHTS, RECOLLECTIONS, GREETINGS

Long time ago, 1984, I have met Jim Rice, on the occasion of my first International Conference, Numerical Methods in Fracture Mechanics (FM). I was then working on my doctoral thesis, "Conservation Law of J integral type for thin shells", and, naturally, studied papers written by Jim ever since 1968. Later on, during whole my career, it was always about his early his contributions (micromechanical modelling, elastic-plastic FM, fatigue…) that have inspired not only my work, but the whole group in Serbia, still active in FM field, established by Prof. Stojan Sedmak. This enabled us to organize 22nd European Conference on Fracture in Belgrade in 2018 (www.ecf22.rs), with Jim Rice delivering the special lecture on the occasion of 50th anniversary of J integral and also the plenary lecture in the scope of opening ceremony, on the occasion of Griffith's medal awarded to him.

Jim Rice on the occasion of 50th anniversary of J integral, ECF22, Belgrade, Serbia, 2018



# PAUL SEGALL

## ABOUT

Paul is the Cecil and Ida Green Professor of Geophysics at Stanford University. He received his B.S. and M.S. degrees from Case Western Reserve University and his Ph.D. from Stanford. Following his Ph.D., he worked at USGS in Menlo Park before joining the Stanford faculty.

Paul and his group work on crustal deformation measurement and interpretation as well as mechanical modeling of earthquake and volcanic processes. He is the author of *Earthquake and Volcano Deformation,* published by Princeton Press. Paul's current research is focused on induced seismicity due to fluid injection, physics-based eruption modeling, and the mechanics of volcanic caldera collapse.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

I first met Jim as a young grad student at AGU. I was struggling with an elasticity problem, which I explained to Jim. He grabbed a pad of paper and cogently explained what needed to be done. It was not the last time I benefited from Jim pulling out a pad of paper.

Our first collaboration, on merging rate-state friction with inelastic pore-pressure effects started on a field-trip bus, and continued while Jim was on sabbatical at Stanford. Working with Jim is like taking a master class from a virtuoso. There are no erasures (he only writes in pen), or crumpled pages, no reaching for books to look up methods or inverse transforms. Many pages later he arrives at the elegant result.

Jim, you've been a role model for me. Your virtuosity and work ethic are unparalleled. I can however aspire to your superb mentoring, attention to early career scientists, and assiduous scholarship.

Jim, John Rudnicki, and me at the Newton Institute in Cambridge

# BRUCE SHAW

## ABOUT

Bruce Shaw is a Lamont Research Professor at the Lamont Doherty Earth Observatory at Columbia University. He received his A.B in Physics at the University of California Berkeley, his Ph.D. in Physics at the University of Chicago under the supervision of Leo Kadanoff, and did a postdoc at the Institute for Theoretical Physics at the University of California Santa Barbara under the supervision of Jim Langer.

His main research interests are in the Physics of Earthquakes. Current work centers on developing earthquake simulators and improved methods for estimating seismic hazard. He serves on working groups developing the latest national seismic hazard maps in the United States and in New Zealand.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

As undoubtably in all fields Jim has touched, he was a central pillar in the earthquake science community when I joined it as a young scientist. As I got to know him, first as a distant leader, then as a collaborator trying to work through some deep scientific questions, and finally on a more personal level, I came to appreciate how intensely he cared about the science and the community that nurtures its growth. His tending the fields, planting so many seeds, plowing through and adding heaps of fertilizer, Jim has been a Johnny Appleseed and Paul Bunyan among the FARMers (Fault And Rock Mechanics folks, as we called ourselves). As the wonderful harvest of people who gather here to celebrate his bountiful contributions attests, I would like to add my glass in toast and have all take a sip and raise their pore pressure and voices: Hear hear Jim!

# Paul Sorensen

ABOUT

After receiving his PhD from Brown University in 1977 Paul went to work at General Motors Research in Michigan. He returned to Providence in 1979 to develop the ABAQUS finite element software together with David Hibbitt and Bengt Karlsson. Paul retired from ABAQUS when the software was sold to Dassault Systemes in 2005.

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THOUGHTS, RECOLLECTIONS, GREETINGS

I often reflect on the incredible good fortune that came my way when Jim agreed to take me on as a graduate student. Jim offered patient guidance and suggestions when I was struggling to make progress on my thesis. Jim was always gentle and kind. It was an exceptional honor to be Jim's student.
Thank you, Jim. I have carried your lessons of kindness and careful consideration for others with me throughout my life.

# LEV TRUSKINOVSKY

## ABOUT

Lev works in PMMH, ESPCI, France, as a Directeur de Recherche CNRS. He is a former President of the International Society for Interaction of Mathematics and Mechanics and a former Editor in Chief of Continuum Mechanics and Thermodynamics. He was a postdoc with Jim Rice in 1989-1990 and then spent a sabbatical at SEAS in 2010-2011. His interests range from fracture and plasticity to soft matter and biomechanics.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

I arrived to the USA as a refugee in 1989 and Jim, almost literally, took me from the street as a postdoc. Moreover, at that time I did not know fracture because my background was in fluid mechanics.

My postdoc did not result in a single journal publication with Jim and still he made sure that I received a faculty appointment directly as an associate professor after this one year with him.

No words can adequately express my admiration for Jim both as a scientist and as a human being. By example, he taught me not only how to think deeply but also how to be a decent man.

Likewise, I fondly remember the warmth of Renata with whom we shared our Eastern European sensibilities.

I wish Jim and Renata lots of health and happiness in the coming years.

# VICTOR TSAI

## ABOUT

Victor is an Associate Professor of Geophysics at Brown University. He received his undergraduate degree in Geophysics from the California Institute of Technology and his Ph.D. in Earth and Planetary Sciences from Harvard University, under the guidance of Prof. Jim Rice. He was a postdoctoral fellow at the U.S. Geological Survey and a professor at the California Institute of Technology before moving to Brown.

Victor's research touches on many areas of geophysics including glacier mechanics, seismic imaging, earthquake ground motions and mechanics, ambient seismic noise, wave propagation, geomorphology, and planetary geophysics.

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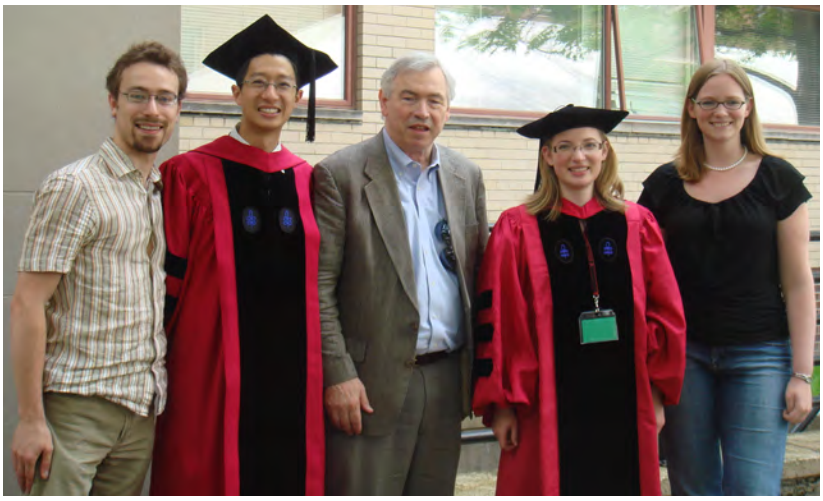
## THOUGHTS, RECOLLECTIONS, GREETINGS

Dear Jim and Renata,

Thank you so much for all the support over the many years. Both the academic and broader guidance have been invaluable for my career and life. Jim, I hope you have enjoyed the decade-long foray into thinking about glaciers that I "forced" (or nudged?) you into! In any case, with my recent move back to Boston, I hope to see both of you more frequently.

-Victor



Harvard Commencement, June 2009: Robert Viesca, Victor Tsai, Jim Rice, Elizabeth Templeton, Nora DeDontney (L to R)

# TERRY TULLIS

## ABOUT

Terry is a Professor Emeritus and Research Professor in the Department of Earth, Environmental, and Planetary Sciences at Brown University. He received his BS in Geology at Carleton College and his MS and PhD in Experimental Geophysics at UCLA.

Terry primarily works on high-pressure experimental rock deformation. He has focused for many years on understanding the processes involved in rock friction with applications to understanding earthquake mechanics, focusing both on rate and state friction and on high-speed weakening processes. He has also worked on numerical simulations of earthquakes. He initiated the series of Gordon Conferences on Rock Deformation, founded the Fault and Rock Mechanics focus group of the Southern California Earthquake Center (SCEC), served on both the Planning Committee and Board of Directors of SCEC, and has been the Chair of the National Earthquake Prediction Evaluation Council.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

I was partly influenced to come to Brown in 1970 because I learned Jim Rice was here. A few years later I was the PI on a grant from NSF's then-existing Research Initiation and Support (RIAS) program. Its purpose was to build an interdisciplinary research and education group that could be self-sustaining once the 5-year grant was over. The focus was to establish stronger interactions between Brown's Geological Sciences Department and Jim Rice and other colleagues in Brown's Engineering Division, with a focus on earthquake mechanics. Jim, I, and others taught one course on this topic before Brown lost him to Harvard. Jim was one of the reasons, in addition to wanting to work on interesting science with more direct societal relevance, that I turned my research from high-temperature plastic flow of rocks to rock friction and earthquakes. The unique high-pressure rotary-shear apparatus that I designed and built through this RIAS collaboration has helped sustain my research in this direction for the last 40 years.

I have collaborated with Jim more since he went to Harvard than while he was at Brown! My wife Connie Worthington and I have enjoyed seeing Renata and Jim in Cambridge and at SCEC, and treasure our friendship. So many fond memories, including my briefly staying at their home while on a sabbatical at Harvard.

# KOJI UENISHI

## ABOUT

Koji is a professor at the Department of Advanced Energy and the Department of Aeronautics and Astronautics of the University of Tokyo, Japan. He earned his baccalaureate and master's degrees of engineering in aeronautics and astronautics from the same university and received his doctoral degree of science in geophysics and mechanics from Vienna University of Technology, Austria. In October 2000 he joined the group of Professor James R. Rice and Doctor Renata Dmowska as a visiting scientist and joyfully stayed at Harvard until September 2002.

Koji is currently investigating fracture dynamics of brittle solid materials and developing practical techniques for wave-controlled disintegration of solid structures.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Dear Jim and Renata,

Happy birthday! I always remember the beautiful and fruitful days with you in Massachusetts, and of course, the Wilson Farm in Lexington and Fresh Pond Sea Food in Cambridge, which we visited together in fall 2001 and speak of every time we meet. I have not seen you since July 2019 but hope to talk to you both in person in the nearest future!

Best wishes,
Koji

November 4, 2001

Pierce 227, August 23, 2002

# ROBERT C. VIESCA

## ABOUT

Rob is an Associate Professor of Civil and Environmental Engineering at Tufts University. He received his undergraduate degree in Civil Engineering from Tufts University in 2005, his Ph.D. in Engineering Sciences from Harvard University in 2011, under the guidance of Jim, and postdoctoral training from Dmitry I. Garagash at Dalhousie University.

Rob's research group works on problems of applied mechanics and mathematics within the areas of fracture, friction, geologic fault operation; with a focus on non-linear coupling, asymptotic analysis, instabilities, and dynamical systems; and a reliance on laboratory and field observational constraints.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Sitting in a college chair in your office, looking at your chalkboard, and seeing "bullpen" above the telephone number for the student office.

The family you and Renata created in the group.

Dinners at Gran Gusto, before and after graduation.

The impression that, despite your busy schedule, time stood still in our meetings.

Your appreciation and patience for deep thinking.

Your furrowed brow, always on point.

The scent of books from the full, imposing shelves.

The pile of recognition on the filing cabinet.

Rooted in observations; not one to be carried away.

Battelle Conference Center (1969); G. R. Irwin (left); J. R. Rice (center); and J. P. Hirth (right).

Pierce Hall (2012); J. R.Rice (left); and R. C. Viesca (right).

# John Willis

## ABOUT

John is Emeritus Professor of Theoretical Solid Mechanics in the Department of Applied Mathematics and Theoretical Physics, Cambridge University, having previously held that professorship and before that posts in Imperial College, the Courant Institute, Cambridge and Bath (in that order). He was Editor of the Journal of the Mechanics and Physics of Solids from 1982 to 2006 (jointly with LB Freund from 1992 to 2002 and then with K Bhattacharya).

His research since retirement has been on problems in strain-gradient plasticity and most recently on acoustic wave propagation in composites and metamaterials.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Hi Jim!
I still recall, quite vividly, when we first got to know each other. I was very happy to share my office with you during your sabbatical in Cambridge, in 1971 I believe. Of course I was well aware of your brilliant early work, from the preprints you sent to Rodney Hill and you were already the obvious world leader in the theory of fracture, so I was slightly surprised as well as interested, when you told me that you planned to move into geophysics – the other field in which you have been so influential. I recall also that you always stayed in the office working when I went off to lunch but I never learned the lesson! Thank you, for half a century (so far) of friendship and inspiration!
Yours ever,
John

# TENG-FONG WONG

## ABOUT

Teng-fong Wong is a research professor at The Chinese University of Hong Kong. He joined CUHK to serve as the founding director of its Earth System Science Programme in 2013, after teaching for thirty years at the Department of Geosciences, Stony Brook University, where he continues to be a professor emeritus and research professor.

## CONTACT

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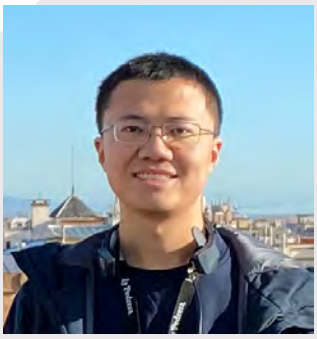
## THOUGHTS, RECOLLECTIONS, GREETINGS

As a graduate student, for quite a while I was lost in my search for the kind of research that is "down to earth" and with a "right" balance of experiment and theory in mechanics. Bernie Budiansky, my advisor at Harvard, suggested a path integrating geophysics and mechanics, which prompted me to move down Mass. Ave. and get my hands dirty in rock mechanics experiments at the other institute. Near the end of my doctoral thesis work, while I was stuck at a juncture to connect my lab data to the broader context of earthquake mechanics, it was my good fortune to encounter Jim in one of his visits to the Brace lab. Jim patiently went over my data and pointed out how this "little paper" of his would provide a consistent interpretation and analysis. Publications of Jim and insightful discussion with him have since guided and motivated many of my research projects over the years. Renata and Jim have also been most supportive as mentors and friends throughout my career.

I am sure all of us have appreciated and benefitted from working with Jim and Renata. With this symposium, we celebrate their prolific and fruitful researches and look forward to a continual flow for many years to come.



# ZHUO YANG

## ABOUT

Zhuo received his Ph.D. from Harvard University in 2021 under the guidance of Prof. James Rice. Before coming to Harvard, he received his undergraduate degree in geophysics from University of Science and Technology of China.

During his study in Harvard, he worked on several projects on the evolutions of permeability in fault damage zones and consequences for earthquake triggering. Besides, he is also interested in ambient noise seismology, especially in using such method to monitor changes of Earth material properties.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

During my PhD life at Harvard, Jim is always supportive of me and gives me opportunities to explore different research projects. I really appreciate his mentorship and encouragements. It is such a great honor and pleasure for me to work with such a wise and thoughtful scientist. Thank you, Jim!

Nov. 2018

Jan. 2020

# ALISSAR YEHYA

## ABOUT

Alissar is an assistant professor at the American University of Beirut and a research associate with Rice Group at Harvard University. She joined Jim's group as a postdoc in Sept. 2016 and since then she works with him on induced seismicity caused by fluid perturbation, understanding the healing processes of microcracks in fault damage zones, and the effect of permeability evolution on the earthquake cycle.

Moreover, she is interested in the environmental issues associated with gas and oil production, mainly understanding the fate of fracking fluids in the subsurface and how this relates to the complexity of the surrounding permeability structure, in addition to the methane migration to the surface or to nearby aquifers during and after operations

## CONTACT

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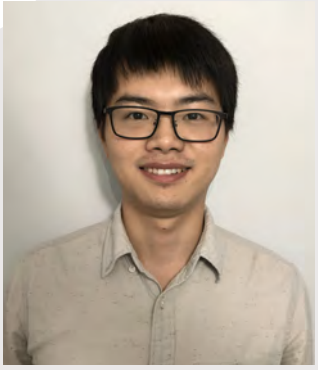
## THOUGHTS, RECOLLECTIONS, GREETINGS

It is hard to talk about Jim because whatever I say, there will always be more to share about this extraordinary professor and generous person. Briefly, working with him has been a life-changing experience full of learning, support, and mentorship. No words can describe how privileged I am to have known him and Renata. In a new country, miles away from mine, they were like a family to me. With their concern and friendship, they brought joyful moments to my life in Cambridge. Thank you both and I wish you a healthy and prosperous life…



# JIUXUN YIN

## ABOUT

Jiuxun Yin is currently a graduate student at the Department of Earth and Planetary Sciences, Harvard University. He received his bachelor's and master's degree at USTC (University of Science and Technology of China).

Jiuxun's research focuses on the dynamics of earthquake rupture. Specifically, his research interests include developing innovative methods for seismic observations and applying dynamic rupture simulation to build physical interpretations.

## CONTACT

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## THOUGHTS, RECOLLECTIONS, GREETINGS

Jim is one of my committee members, and I've really learned a lot from him for these years at Harvard. Before I came to Harvard, I've heard the famous name of James Rice frequently and read many papers of his. When I first met Jim in person, I just found out this gentleman is such a kind professor, and it is always a great pleasure to chat with him. I took Jim's class "Mechanics in Earth and Environmental Science" twice (officially enrolled in my first year and audited three years later). Every time I went to his class, I could always be inspired, and I really enjoyed learning from and discussing with Jim.

I still remember the first time I had an individual meeting with Jim to show him my work. At that time, I just started my Ph.D., and I was so nervous. But it turned out to be a delightful meeting; Jim carefully listened to my presentation and gave me many helpful suggestions, from which I've benefited so much. More importantly, as a G1 graduate student at that time, this experience greatly encouraged me and gave me huge momentum to move forward.

Thank you so much, Jim. Happy birthday and I wish you and Renato all the best for the future!