



*Honoring the Life, Work and Heart of:*

**LESTER B. LAVE**

1939 - 2011

The Harry B. and James H. Higgins Professor of  
Economics and Finance and University Professor

**Carnegie Mellon University**



There are opportunities.  
The kind that show you how to stand out.  
The kind you seize.

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Lester B. Lave was a visionary researcher and problem-solver. World-renowned for taking chances and jousting with the unconventional, Lave wouldn't just look at a problem, he would dissect it.

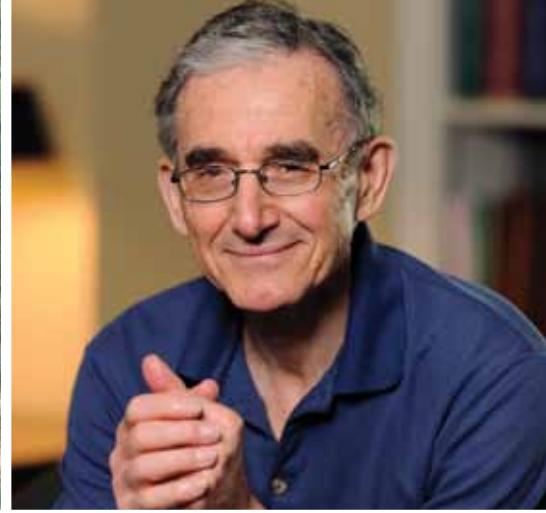
Whether it was global climate change or the health of Pittsburgh's rivers; dam safety or truck drivers with diabetes, Lave found them all fascinating. To seize the moment, Lave used a cache of tools. His background in economics was just one of the tools he employed. He educated himself in engineering and health sciences in order to understand the important problems that affected society. To that end, he founded a field of study called "life-cycle assessment." All his cycles of success and exploration are chronicled here in this memorial booklet.



"Throughout his career, Lester demonstrated what it means to conduct important, and sometimes controversial, research and how to forge an interdisciplinary approach to problem solving. The impact that his work has, and will continue to have, on public policy is truly remarkable and society has benefited substantially from his efforts. Lester knew that often the most fertile ground for research is between the silos—and the bridges that he built between disciplines, schools, and institutions will forever connect us with his legacy."

Bob Dammon,  
dean, Tepper School of Business, Carnegie Mellon University





“Lester Lave was a visionary whose problem-solving skills and enduring curiosity about the world around him make his research legacy so enduring for generations to come.”

Pradeep K. Khosla,  
Philip and Marsha Dowd University Professor and  
dean, College of Engineering, Carnegie Mellon University

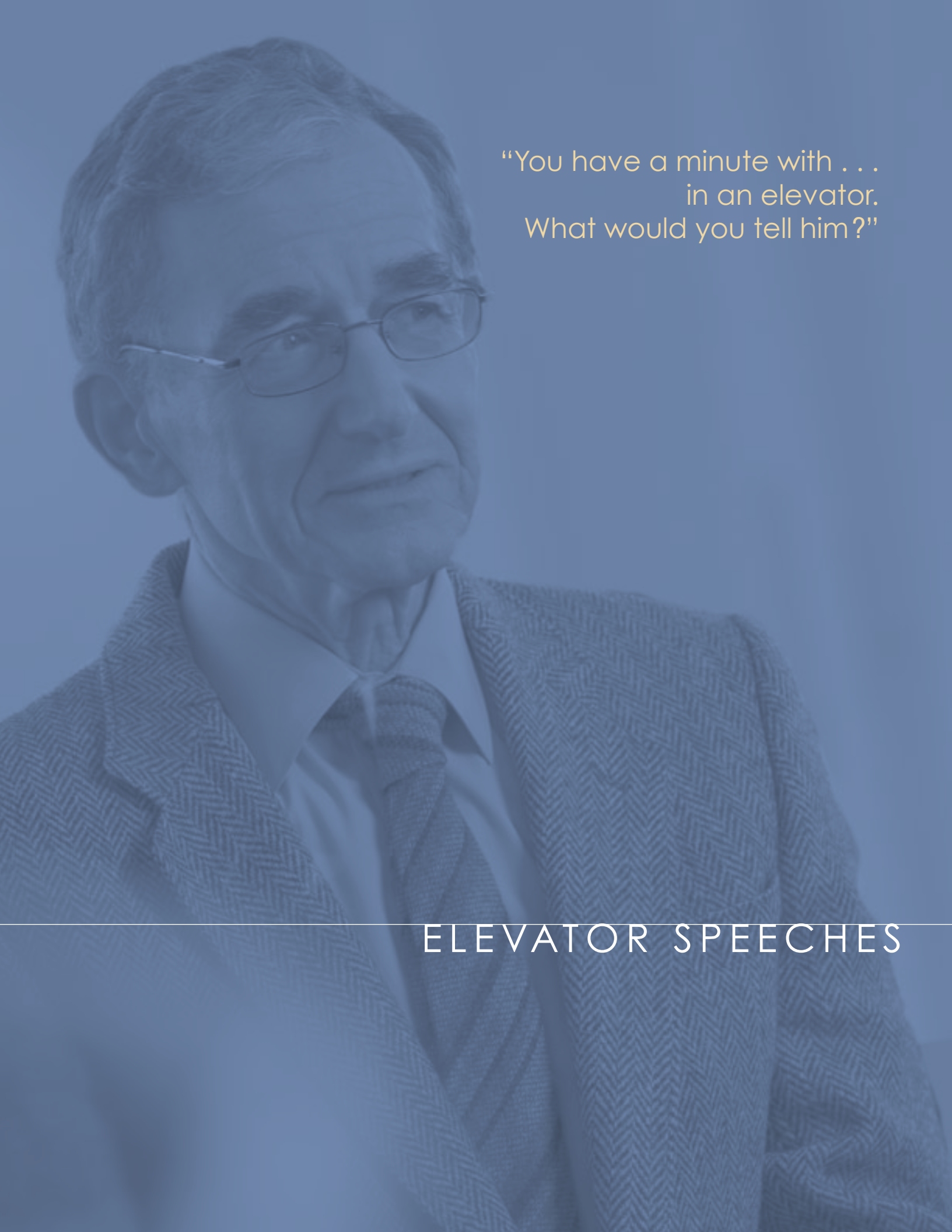




“Lester Lave, a world class environmental economist, conducted work that spanned both academic and industrial sectors. His scholarship and outreach always had the goal of making industry and the environment more compatible.”

Ramayya Krishnan,  
William W. and Ruth F. Cooper Professor of Management Science  
and Information Systems and dean, H. John Heinz III College,  
Carnegie Mellon University





“You have a minute with . . .  
in an elevator.  
What would you tell him?”

ELEVATOR SPEECHES

"There were many reasons that I felt honored and excited to become the president of Carnegie Mellon; one of them was Lester Lave.

I did my graduate work from 1969 to 1973 in environmental systems engineering and was an active teacher and researcher in the field until I came to CMU in 1997. Throughout these three decades, I was well aware of Lester's work. Indeed, you had to be if you were serious about environmental problems and their solutions. I worked on urban transportation and energy, as well as environmental quality, all areas in which Lester made major contributions.

It was a privilege to meet Lester and a pleasure to get to know the man behind the legend. As the contents of this volume display vividly, Lester was a wonderful person—a tremendous scholar who brought great insight and integrity to his research and a great person who cared deeply about his students and colleagues.

Lester also cared deeply about Carnegie Mellon. He was totally committed to the university and was constantly looking for ways to improve it and promote it.

I am so pleased that a professorship and graduate fellowships will be established in Lester's name, memorializing his enormous contributions and, as he would want it, supporting future generations of researchers and teachers who strive to match his impact. I thank Lester and Judith for their magnificent generosity which made this possible."

Jared L. Cohon,  
president, Carnegie Mellon University

"Lester Lave was an icon at Carnegie Mellon, where he had achieved the highest plateaus in scholarship and friendship. His work transcended many fields, most notably in areas of risk, the environment and economic decision making. The world has been changed by his work; a claim that not many can make. A multitude of friends worldwide are left behind but his work continues through these same colleagues and friends, as well as his former students."

Mark S. Kamlet,  
provost and executive vice president, Carnegie Mellon University

**Over time Lester Lave refined the classic EPP dissertation defense question that can be paraphrased as follows: “You have a minute with <insert name of important person here> in an elevator. What would you tell him?”**

**We posed this question to the EPP community and to others of Lester's friends, colleagues and students, asking them to tell us what they would say to Lester if they had the chance while riding in an elevator with him. Here is what they said:**

Lester, I still remember and appreciate all the help you gave me in the job market and that Lee and I fondly remember the month that we spent living in your house back in 1968. Your kindness and generosity was remarkable and greatly appreciated. I will never forget my first coauthor. – Warren Weber

Lester, thank you so much for being such a good friend to RFF and in particular to those of us who work on electricity issues. Your sage advice was very helpful in the initial days of the RFF Electricity and Environment Program and it stays with me to this day. Thank you for sending several of CMU's excellent students to us over the years and for the collaborations and friendships that has spawned. Thanks for getting me to take a tour with you of the Resource and Conservation Center chillers here at RFF, where we both got a look at energy storage in action. Your lifelong curiosity will always be an inspiration to me. – Karen Palmer

Lester, you taught me how hard one has to work to get good at something and that something need not be a small extension of what one has done before. You taught me that one doesn't understand something until one can write it down to explain it to others. – Roman Weil

Lester, you were pretty much my contemporary in years when I was a MITRE-CMU co-op grad student in EPP, but you ran circles around me in wisdom, understanding, and flexibility. I never forgot you, and I will continue to remember you with honor. – Steve Goldstein

Lester, I appreciate the way you were so clear and incisive in your thinking, and how you were happy to have intellectual discussions anytime, anyplace. You asked me the hard questions and pointed out the holes in my work before the grant reviewers and paper reviewers could see them, so that I had the best chance of fixing mistakes and being successful. To me, you epitomize all that is good about academia: the sharp intellect, the complete lack of pretense, the honesty and integrity and brilliance with which you analyzed every problem, and a body of scholarly work that has actually saved lives. Thank you for being a lasting role model to me and so many others. And thank you for welcoming my family to your home for so many parties and dinners—we had wonderful times together, especially with the four children running around your yard. – Felicia Wu

On a one minute elevator ride, I'd thank Lester for being a great mentor, guide, example, and inspiration. It means a great deal that he has used his time, talents and capabilities to work on problems that matter. He's made meaningful impact in the world because of it, while inspiring the next generation to rise to the challenge. Lester has influenced my life path, and I am grateful for it. I admire Lester and will miss him. – Jeremy J. Michalek

From the day I first interviewed for a job at CMU I felt Lester's keen ability to understand a research problem and immediately engage a person exactly at the core of it. And this early impression endured. Discussing any topic with Lester was always a lesson on thoughtfulness, depth of knowledge and pointedness. It was such a treat to have such an intellectual force around the department and the school. I will miss him greatly. – Francisco Veloso

If I had a minute with Lester, I'd just want to tell him thank you. He's been a wonderful mentor over the years, and always lit up any time I've run into him, no matter the demands on his attention from surely far more important people. We had him here at NC State a few years ago to give a seminar, and people here still talk about it. He is a true leader, and loved and revered by his students. – Chris Frey

Thanks so much for being there, for seeing me for who I am, for providing a career path for me to strive to emulate, but most importantly for becoming my definition of what it is to be a good mentor. – Erica Fuchs

Thank you Prof. Lave for challenging me to think about the meaning rather than just the results. You pushed me to believe that I could do something meaningful and I needed that push to get beyond my own cluttered mind and feelings of inferiority to put in the time needed to find the connections. At the time, I was less than receptive, but in hindsight you gave me the confidence that I guess I could not have developed in any other way. Thank you for that. – Sharon Jones

From Far East, I show the highest respect to Professor Lave, one of the best professors in EPP and a role model in our work and life. – Rosy Chen

I never told you how much I valued the time we worked together, how you taught me by example to spend the necessary time determining the right question to ask. I often catch myself wishing that I could ask you your opinion of some idea or another. There's really no one who can take your place. – Elizabeth Casman

What would I tell Lester in a minute, as a student, when my mind would be filled mainly with questions about what is important in life and what is not? I would probably say:

remember those moments in seminars, your office or even at dinner, where you made me reflect on my knowledge about all sorts of things. Some of these moments felt difficult for me, like walking into the dark, though not completely alone. But it made me find daylight later on, and for this I am grateful. – Stefan Schwietzke

I'd like to tell you how thankful I am for the profound impact your work has had on the air pollution field, on behalf of all the people who live healthier lives today because of your pioneering work. I personally feel deeply privileged to have interacted with you when I was a student in EPP. You always challenged and inspired us, and were amazingly gracious and generous with the guidance you provided. – Jana Milford

Lester will always be remembered as one of the world's great university professors. His research is world-renown, and has made the world a better place. Yet, he always seemed to make students his priority. He made time to meet with students, taught classes that were fascinating to attend, and had a way of challenging students to perform at a level beyond what we believed that we could achieve on our own. Lester was an inspiring individual, because he loved what he did. I remember numerous conference gatherings in which he would close the meeting with something to the effect of, "I don't know how you get your kicks, but this has been a lot of fun for me." – Paul Hines

Lester's greatest asset as an advisor and mentor was not his credentials, his expertise or his sharp mind, but his kindness. He fully understood the pressures of grad school and did his best to help us deal with them in addition to his academic advice. He was never condescending and his criticism was always constructive. Once, when we flew to a meeting together, Lester's seat got upgraded to business class. The first thing he did was offer his seat to me. The best compliment I ever got was after a meeting. "If I hadn't seen you, I would have thought Lester asked that question." Lester taught us to think critically and ask the important questions. He taught us, by example, the importance of intellectual honesty and integrity. I feel extremely lucky to have had Lester as my advisor and mentor for the last 2.5 years. I am a better engineer, researcher and person because of him. – Shira Horowitz

Lester has an uncanny ability to cut through the complex elements of large, sticky problems and ask the most penetrating question in a way that enables effective student learning—and he does this in a most caring way. – Cindy Atman

I took a course in economics from you as an undergraduate in the 1970s. While I learned economics, what you really taught me was how to question conventional wisdom and how to actually "think" about a problem. Thank you and God bless you. – Bill Rish

I guess in the elevator situation I would tell Lester how I was always impressed with how he could immediately get to the heart of an issue with a fairly simple question. I'll always be grateful for the impact he had on me directly, and the impacts he had on those who shaped my time in EPP, especially my advisors, Scott and Mike. Most importantly, I'll always remember how universally respected he was, yet how he was willing to chat with even the greenest graduate student or prospective EPP candidate. His combination of world-class expertise, generosity with his time, and genuine interest in helping others epitomized my experience in EPP. Our community wouldn't have been the same without him. – Matthew Kocoloski

I want you to know how important you were in my life. You are an example of honesty and wisdom that I will always strive to follow. From the first time I heard you give a talk, I knew I wanted to learn from you. I will always be grateful that you gave me the opportunity to work with you, and for all the time you spent teaching me, and for all the moments we shared. It will be difficult to forget the meetings Saturday afternoon, with Tartuffe (or was it Balzac?) looking at me as he was understanding much more of what you said than what I did. I want to thank you for the trust you deposited in me. I did what I could to respond to it, I know not always in the best way, but I tried as hard as I could. Lester, you are now facing what we all know are going to face some day. This is the only certain thing in life. Who knows what comes next. But you can be sure that there is a lot of people that love you, that consider you a mentor, that will miss you, and that will never forget you. Some say that the only thing you take with you, is what you have given to others. You surely will take a lot with you. Goodbye Lester. We love you. – Luis Cifuentes Lira

As one of the few people around who remembers Lester as an assistant professor, I can comment on his impressive growth from someone who started out tinkering with regression analysis of environmental issues to becoming a major contributor to the knowledge and understanding of the issues involved in policy, and hence a major impact on enhancing more rational policies. In just such a distressingly short time, the world has lost a most important contributor to public policy on environment and energy issues. Closer to home, CMU has lost a major source of inspiration for pursuing our intellectual mission. – Alfred Blumstein

I first read something by Lester before I decided to apply to EPP. It was a definition of sustainability. It was clear, concise and resonated with me. Once I got here I enjoyed discussing my research with Lester. He was always extremely helpful at making suggestions to clarify the questions I should be asking myself. I especially liked his demeanor in these exchanges. It was not as though he was in opposition, or talking from a point of high authority. He would articulate the consensus of economic thought and happily discuss why it may or may not apply

in the given situation. This ability to see other viewpoints with humility, and without rancor made Lester a special individual. I also enjoyed meeting Coco. – Scott Peterson

Your leadership and commitment to excellence has inspired many students to create a better world. May you and your loved ones find commensurate strength, peace, and hope. – Mike Blackhurst

Lester, It may be time for an "I told you so article." You were prescient on so many topics that the rest of us are only now catching up. – Chris Hendrickson

Lester, EPP couldn't have a better expert on the dismal science to guide us engineers in thinking about the economic dimensions of issues. At an EPP seminar or student presentation, you can always be counted on to say something crucial, challenging, and instructive. Despite your enthusiasm for economics, you are surprisingly wary of economic dogma. I remember feeling rather awed by your scathing 1996 critique of benefit-cost analysis, and somewhat disappointed that even the mighty economics profession can't reduce policy analysis to a process that we can all agree on. Much of the economics that I know comes from taking your regulation course, reading your work (or works that you've recommended), and most enjoyably, from listening to your comments at EPP seminars and meetings over the years. Thank you for taking an interest in us engineers, and considering us to be trainable. – Keith Florig

Lester, five things: 1) Thank you for the kindness you have shown me and the model you have presented to me of how one can live one's life. 2) You are perhaps the most intellectually generous person that I have met. Your willingness to share ideas, encourage others to push themselves, and to seriously consider other people's ideas is something that I hope to emulate. 3) Your ability to take a complex problem and see within moments the underlying key components never ceases to amaze me. I think of many times when you would say, "I'm not engineer.... but," and then you would bring clarity to the discussion at hand. Your ability to "detect the signal from the noise" constantly astounds me. 4) I've always felt that you are so very lucky to be passionate about your work. This passion about the mysteries of the world around you and your commitment to being productive and reducing entropy is something that I haven't seen often. It's inspiring. 5) Finally, your incredibly gentle manner in a very ungentle world has touched me profoundly. Thank you. – Carol Goldberg

If I had one minute in an elevator to chat with Lester Lave, I would first thank him for the support and guidance that he's given me in the short time I've had working as his postdoc. I would then ask Lester to spend the rest of our minute telling me what he thinks is important to know because he has one of the greatest minds I've had the honor to meet. – Tamar Krishnamurti

Thank you. For your amazing research contributions to the world. Thank you. For the intellectual stimulation, for the good discussions, for your kindness, and for your guidance and mentorship during my time at CMU. You have influenced enormously the way I do my research, and my critical thinking. – Inês Azevedo

Three things:

1. Lester is the model for how an academic can make a difference in a politically charged, policy environment—ask AND ANSWER the right questions and don't be shy about making sure the answers are heard.
2. Lester also taught by example—never stop learning—both within your discipline and especially within those relevant to your research.
3. From day one Lester encouraged me with my research and did that for everyone regardless of where they happened to be in the academic pecking order. He made us all feel like we were doing something worthwhile.

I will miss being forced to learn new things from my friend's research, but I will never forget his lessons and kindness to all. – Kerry Smith

I've experienced many elevator ride conversations with Lester over the years. I suppose I would approach a farewell ride in a very similar manner. I would, perhaps, be more direct in expressing my fondness for him as a person. I would begin with saying hello to his beloved CoCo and inquiring about his most recent activities. I would then move to a few burning questions that might hopefully produce a thoughtful "Well..." from Lester in response. And of course delight if one of my observations would elicit a snappy "You betcha." Lester Lave is a distinguished scholar, consummate gentleman, and exemplar Carnegie Mellon ambassador. Wishing his family, friends, colleagues, and admirers a peace that passes all understanding. – Sharon Grant

Lester: Co-advising Elisabeth with you was the best introduction to EPP that a junior professor could hope for. That is good: the younger generation of EPP knows we have big shoes to fill. Thanks for being a great mentor. – Peter Adams

If I were religious the notion of an elevator speech with Lester would be highly symbolic. I'm not, but the symbolism is still vivid. This isn't quite what I would say to Lester as other readers need a bit of context...A major motivation for what I do is the health effect of fine particles. They kill people. Something like 1-2% of all deaths in the U.S. come from this air pollution. An enormous amount of effort has gone into this problem over the past 20 years. The EPA has a national ambient air quality standard on fine PM, and it has worked. These days you have to dig to discover the pioneering work on this topic: Lave and Seskin, Science, 1970. Twenty three years before the Harvard 6-City Study of 1993, Lester laid the foundation establishing the link between fine

particles and mortality. As an economist, he addressed an area of science at the junction of epidemiology and atmospheric chemistry. I learn every day about the unique ability that CMU has to foster interdisciplinary research; this is why it is such a wonderful place for me. Ultimately this is an outcome of some few enormously visionary talents, and Lester is without question near the head of that list.

– Neil Donahue

Thank you Lester. For 37 years you have been a wonderful friend, a tough, thoughtful and inventive colleague and co-author, and a great teacher and student. You've taught me a lot about both the strengths and limitations of the economics paradigm. I greatly admire the fact that you have always done your homework when you tackled a new problem. I've often told you I wish it were possible to stage a debate between the brash 40-year Lester and the sage, but no less tough, 70-year old Lester. What great fun that would be! – Granger Morgan

Lester, you've taught all of us a simple, elegant message that we will all pass on to others: "Work on problems that matter." Indeed, we will do our best to do so.

– Costa Samaras

In retrospect, I wish I'd made the opportunity to work with you more while I was in EPP. I completely agree with Felicia that you epitomize much of what is good about academia; e.g., sharp intellect, lack of pretense, integrity, hard work, high productivity. Thank you for the energy you put into making the world a better place. – Joshua Mindel

I am not personally close with Lester, but the examples he set and the impacts that he had on us and on the larger academic community is so profound that it is very difficult to feel the depth of the loss and sadness. – Sonya Yeh

Over the past decade-plus, I have enjoyed being in several "elevator talks" about Lester, and I would annoy Lester by telling him about several; he probably would be anxious to reach his appointed floor. I recall with great clarity your tenacity for posing well the right question, then your appreciation for the hard work to pursue it, and I recall with gratitude the guidance you offered as a member of my committee. Lester, you are a professor of great modern importance, but a professor in the ancient university tradition: inquiring with energetic curiosity, and time to devote in dialogue with aspiring and curious students. You have shared your time with us generously, and we are enriched. Thank you. – James Corbett

You taught me how to be a better husband, how to be a better father, and how to be a better researcher, in that order. You showed me that the "safe" path is the path not worth taking, and that I shouldn't shy from controversy. You proved to me on several occasions that there is no such thing as data so bad that an economist wouldn't use it. I have tried hard for the past 18 years to live up to your standard, and owe it to you to not forget these lessons in

the future. – Scott Matthews – P.S. Don't forget to send a trip report.

Chilean environmental legislation owes much to Lester Lave's commitment to follow through beyond academia. He had a world class ability to put himself at risk at the beginning of every class he taught, most of the time starting with a blank transparency and challenging his class to identify the real issues and to explore together the many ways in which one can frame a problem by understanding each stakeholder's biases and limitations before attempting to offer alternative courses of action. I was lucky to have been a member of his Economics of the Environment class and to apply his teachings to get started fixing our environmental problems in Chile, starting with arsenic. He kindly accepted to be part of the review panel of the first environmental piece of legislation on that topic back in 1996 and I am sure he would have been delighted to find out that we are now in the process of upgrading it as we make progress towards living in a cleaner environment than was possible without his contribution.

– Al Lopez

I will always be grateful to Lester for encouraging me to apply to EPP. I contacted him when I was first considering applying to graduate school because of his LCA and biofuels research, which I found fascinating. I thought CMU and EPP were a reach for me since I wasn't an engineer, but he said to apply and I did. And next year I will be heading into a new job where people see me as the resident engineer. Lester opened my mind to so many new ways of thinking, and he will be missed. – Sharon Wagner

Lester, I've been meaning to say thanks for all the sage advice you imparted to me both at Carnegie Mellon and beyond. I'm sure there are countless students—past and present—who feel the same way. The accumulated wisdom you have shared with us all over the years will continue paying positive dividends long into the future. As a junior faculty member with most of my career still before me, your professional life has been truly awe-inspiring.

– Joe DeCarolis

There are a few people whose faces and voices go hand in hand with what it means to be from EPP. In the countless conversations I have had with people since my EPP days, one resounding name has been Lester Lave. Lester, I did not have as many discussions with you as I should have, but your very presence and hearing your piercing questions at the end of seminars made me want to strive to be a clearer, sharper thinker. You work on fuzzy, complicated problems that most people would rather steer clear from. Embracing such problems is what you are associated with in my mind. There is a nation of environmental scientists and economists that will miss you, and more urgently, the worry of who will tend to the helm of questions central to sustainability, now that you are no longer with us. You will be missed. – Shahzeen Attari

Lester, I will never forget the time you took to write me a long reflective email about the personal and professional trade-offs in academic life on learning of my decision to move to Calgary. I admired your commitment to give of yourself, and your passion for speaking honestly and rationally about topics personal and professional.  
– David Keith

Here is something I would not be brave enough to tell Lester on an elevator ride: Lester is the kind of university professor others aspire to be but very few, if any, will become. He is the right amount of intimidating. Once you conquer your insecurity, you will discover the unmeasurable level of support he gives his students and colleagues. Of course, your insecurity will often arise again after chatting with him, which in turn pushes you to become a better person and professional. All of us who had the privilege to know Lester, will now have to work very hard to honor him and his family. – Paulina Jaramillo

Thank you for being such a great mind and a great heart, and for being so humble to make the time and share yourself with all of us. The world is a better place not only because of all your contributions to the scientific world but also because of your being a role model to everybody around you, with wisdom, competence, experience, an open mind and humbleness. I still remember you smiling and doing a mock interview with me when I graduated – as Coco was watching us in your office... I still wish I could have come back earlier to catch up with you after such a long time... I saw you in a hurry at the end of the corridor and thought I would catch you later to schedule lunch.. I wish I had run after you. I will miss you very much. Thank you for everything. – Umit Guvenc  
*Umit also pointed out this video: [http://wms.andrew.cmu.edu:81/nmvideo/tepper/Lave\\_gas-new.mov](http://wms.andrew.cmu.edu:81/nmvideo/tepper/Lave_gas-new.mov)*

While an "elevator" speech is appropriate for most people, the Lester Lave that I know would never take the elevator if he could avoid it, instead choosing to rush up the stairs two or three at a time (with his supposedly fit graduate student huffing and puffing behind). So, here is what I would say if I were trying desperately to keep up while climbing the stairs up to the top floor of Posner. Lester, you have been a fantastic advisor, mentor and friend. It is difficult sometimes to fully comprehend how much you have shaped my life over the past decade—if not for you, I would not have moved from Portland to Pittsburgh, would not have crashed and burned as a graduate student the first time around, and would not have pulled myself up to finish my Ph.D. in EPP. Along the way, I would not have met my wife and we would not now have a terrific daughter. You often said to me that your philosophy for advising me as a graduate student was to "give me enough rope with which to hang myself." Naturally, I tried time and again to hang myself and I will never forget the patience and humor that you showed. You taught me how to think systematically about hopelessly complex topics.

You taught me that passion is just as important as brains, and much more important than whether or not we agree on something. You redefined what it meant to have high expectations of myself. Most importantly, you taught me that real value in economics is in getting your hands dirty to make people's lives better. – Seth Blumsack

As you know, you have been a pivotal person in my life and I often find myself repeating small "Lesterisms"...those pointed sayings or insights that in a few words zing right to the point. I thank you for the opportunity to attend CMU and finally end up in Minnesota, in a job that is a much better fit. Your generosity with your time and small kindnesses have also inspired me...letting me stay with you and Judith on my first visit to CMU, hosting parties in your back yard (where our 2 year old Amelia wanted to dress as a lion, and we made her wear her pretty dress....mistake). Your way of asking a question, so well phrased and incisive the recipient did not feel the bottom drop out. Not for you the blunt hammer of the departmental physicists! Rather a kind word and observation wrapped around a profound insight. While I don't possess the same skill, I remain a deep admirer of yours. Thank you for everything. You are missed.  
– Elizabeth Wilson

Lester, you influenced my life in so many ways that saying "thank you" is an understatement. From the many times you advised me on research questions and methodologies, always smiling when we reached various conclusions (e.g., I remember you asking if I believed the Oak Ridge biomass modeler's results and I replied by saying that the bioenergy markets do not exist yet, and a different bioenergy group in Texas told me the Oak Ridge results are wrong ... you just smiled). To the many evenings with you and Judy having dinner and Scotch talking about travel and our dogs, laughing at great and tragic stories (Cary and I always gambled that taking Buddy to her office in the Heinz School was OK, because Coco was always with you). To the times since leaving CMU, when people ask who my CMU advisers were and I say you. Those that know you always smile and tell me a great story about their experience with you. You inspire so many Lester, and your influence is so alive in so many people ... THANK YOU!  
– William Morrow

Lester, whenever I was at a meeting with Jay, and the conversation would stray to economics, Jay would usually say, "let's see what Lester has to say about this." And you would come over and give us your insight, generously donating a few minutes of your time to save me hours of my own. I will miss having Coco patrol the aisles during a CEIC seminar or wander into Jay's office during a meeting. Thank you for making EPP and CEIC such a wonderful place to work and learn. – Colleen Horin

I read the very fine draft obituary, and I recalled another of Lester's huge contributions: his classic book on The Strategy of Social Regulation (Brookings, 1981), which framed the

paths of policy analysis for a generation and more. In our book on Risk vs. Risk (1995), the first person we cited in our list of eminent "pioneers of risk tradeoff analysis" was Lester.  
– Jonathan Weiner

I never forget the day I came to your office to introduce myself in light of my upcoming civil engineering qualifying exam of which you were on the committee. After an hour of conversation you said that you realize the last hour was not comfortable as you challenged and questioned most of what I had worked on up to that point. And you were right, it was definitely not the most comfortable but it was the most inspiring. Dr. Lave, I feel fortunate for the small window of opportunity to work with you. I am sorry that I won't be able to share the rest of my work at Carnegie Mellon with you and I will not have the opportunity to hear your thoughts and comments as I believe they would have had a profound impact on my research. There are not many people who know how to challenge and inspire at the same time. You did! – Yeganeh Mashayekh

I wasn't aware of Lester's "conversations in the elevator," but my most recent interrogation at his hands was in his office several years ago about the small "dark" painting of the wall and the person moving along it. I commented on it to Lester, noting that it had its moods; whereupon he pounced into a psychological inquisition—something that was an interesting repartee for me, but I imagine might have been unnerving for the many graduate students whom I'm sure he had submitted to a similar treatment. Afterward, I thought it was an insightful way of understanding the scope of perception and sensitivities of his visitor(s). He had a probing mind, over every dimension of life, and his joy of inquiry and attempts to gain understanding were contagious. He shall be missed.  
– Dick Schuler

I came to campus a couple of years before Lester and was fortunate enough to interact with him over the years because of overlapping environmental interests. He was a terrific scholar and a gentlemen—he will be sorely missed.  
– Joel Tarr

You may not remember, but our discussion during my EPP interview has framed the way I've approached learning ever since. Know that you have touched countless lives, and made each better. – Kelly Klima

I came to respect Lester very early—a copy of Lave and Seskin resides still in my library. And his contributions as a scholar and later as a friend never flagged. It's hard to believe such a career has come to an end. – Bob Fri

Although I did not have a chance to tell you directly, I would like to say that your class, "Business, Government and Strategy," was one of the best courses that I ever had in my life. It clearly connected academia and real world, and showed me strongly how interesting and important to solve real world issues with an approach endorsed by systematic and theoretical foundations. Without such a

simulative class, I could not imagine what I am doing now. Thank you very much. – Hiroshi Hayakawa

Always ready to pitch in, simply incapable of saying no. Tremendous creativity, a master at thinking outside the box. Unwavering dedication to research that makes a difference. A great champion of the power of economic reasoning, yet interdisciplinary to the core. Boundless energy and enthusiasm. His door was always open, a ready welcome awaiting everyone that Coco ushered in.  
– Dennis Epple

Though you haven't taught me and I have never interacted in person with you during my wonderful years at EPP, the saying goes like this... "Action Speaks More than Words." You are one of the few people who taught me that people can really learn from other people's character without having direct interaction and without their knowledge. You are a great man of character in which I have benefited from without your knowledge. Thank You!  
– Asmerom Gilau

You always worked on hard problems, problems that demanded solutions for our society. Your penetrating analyses, insistence on excellence, puckish humor and doing the right thing for the right reasons are unforgettable lessons for us all. – Greg McRae

Influencing public policy demands very distinct and focused reaction and not just sharp minds and morals. I learnt that careful networking together with excellent teamwork can do the job if one is willing, though leading the process, to be outshined and acknowledge all participants all the time. One thing, though, cannot be substituted with quality of work: timing of response at each and every stage of the policy development and of the crisis emergence. The risk of wrong timing estimation should always be integrated into the policy development process. The principal subject of my 1992 EPP research was important: Foreseeing the future change of 3 water production technologies relative costs—traditional vs. sewage water treatment vs. sea water desalination—from 1:5:10 to 1:2:4. But much more significant was the by-product lesson: The scale of investment in the future technologies is municipal, not national, and so is the control of the resource—sewage or sea water. In a political environment of growing government power at the municipal level—this was the revolutionary political and policy process at our feet—to be identified and utilized. Fondly and with great respect and sorrow.  
– Naomi Angel

Lester had a combination of personal grace, intellectual generosity, and achievements for society.  
– Michael Dworkin

I am moving [from EPA] to a new job at the FDA on May 23. My position at FDA's Office of Regulatory Affairs will be to supervise a small risk management staff who is developing tools and approaches to improve FDA inspections and

risk management decisions by making them more risk-based and quantitative...This news comes in the shadow of Lester Lave's passing. But, it is also related to it in some ways. Today, I pulled out my notes from his "Seminar in Risk Management" (45-858) and found that the insights Dr. Lave shared with my class 16 years ago are as relevant today and are directly applicable to my new position at the FDA. While at CMU, I benefited greatly from his incisive questions, expertise with risk, and passion for finding the right problem to solve. I hope that I will bring some of his approaches to analysis and insights to risk management practices at the FDA. – Neil Stiber

If I had the chance for an elevator ride with Lester I would thank him for the insight that his work gave me. Lester's work profoundly influenced how many of us approach very important decisions. His thinking on benefit-cost analysis has formed the basis of my own approach to the subject, and I regularly cite his work in both teaching and research. The clarity and vividness of his description of both the power of and limitations of economic analytic approaches is something that has stayed with me in the decade since I graduated. I am very grateful to be able to pass on Lester's ideas to my students and know that they will benefit from his work as well. – Patrick Gurian

I thank you forever for the encouragement and trust you gave to me in my first two years at EPP when I needed them the most. As one of the two readers of my qualifier paper, you not only offered me insightful comments but also your confidence in my research potential. You encouraged me to apply for a summer internship at RFF and wrote a strong recommendation letter when I was very worried about my lack of both research experience and adequate English. This experience helped me to overcome my own fear as a doctoral student, and motivated me to help my own students to realize their potential by being encouraging and trusting as a teacher. Thank you!  
– Jinhong Xie

Presenting to you could sometimes be an intimidating prospect, however your sharp comments always came with great honesty and wisdom, and greatly improved my rebound effect research. Seminars just won't be the same without your grilling and Coco's begging. – Brinda Thomas

I am very grateful for you Lester, because you helped me understand the importance of how to logically articulate my thoughts and express them with clarity, to simplify complex systems of ideas and problems and have the opportunity classify, weighting and understand those systems and give a solution and the most important to share those solutions and clear ideas with others. In you I found a support and anchor in difficult times. Also helped me to strengthen my spirit to face the difficulties times. I always find a light in the dark moments, your words always illuminate my path in those dark moments where I felt completely lost, your advice and words gave me peace, confidence and options to not fall in despair and panic, you told me—you have to resist, you are preparing

to endure difficult and hard situations—please do not jump the bridge today. Now summing up, I understand that he also received a transfer of knowledge and training to think and see from a holistic perspective, how to solve complex problems with different angles, doing well and correctly. Learning, not to sin by omission, and demonstrate the passion at work doing things right, not conforming with mediocre results and give up to face barriers or risk threatening situations. Lester supported me in these moments that I had to make a decision and have no idea what to do. Lester thank you because you gave me confidence through your advice. Explained to me that the most difficult is to decide, is distressing, once you choose an option without hesitation get to work, focus your energy on what you chose and stop distressing, you must follow the path even though it is a difficult road. Your last advice was: "There is nothing like a new, challenging job to perk up your life." Dear Lester, Thank you for taking the time to give me advice, share, ideas, vision and knowledge. I will miss you. – Ruth Reyna Caamaño

Thanks for accepting me as your friend and colleague, "thinking like a biologist" and all. When I came to CMU to work with you, Chris, Fran and Scott, I knew right away that I was surrounded by a very special group of people. You were the undisputed leader of that group. You gave me the freedom to contribute, learn and develop into a member of the team. That was an enormous gift. I only hope that I can honor it. Thanks for taking me "up" with you. – Mike Griffin

Thank you for your holistic view, enabling us to see the connections, and your insistence on excellence. You have left the world more knowledgeable, a most important gift.  
– Cliff Davidson

Once when I proposed a research topic, Lester asked me, "What will you know when you know that?" This caused me to question whether particular research topics would really increase our knowledge, generate a clearer picture of a subject, or even be relevant to anything. This advice proved valuable in choosing research areas, and Lester demonstrated its application in his own research.  
– Michael Sattinger

Quoting from an email Lester sent me in 2000: "The more devastating the criticism, the lighter the hand has to be. The object is not to bludgeon the person, but rather to remove their guts so that they don't notice."  
– Hadi Dowlatabadi

I would tell Lester that I love him and I treasure the memories of every conversation and every single piece of advice he gave me during these 10 years. I would also tell him that the impact he had in so many of us, students and people who surrounded him is a powerful inspiration to work hard and keep smiling. – Dalia Patiño

Lester, this is too quick and is a big shock for me and many others. I was just refreshing my memory last evening on my

way home on the metro, thinking about how lucky I was to have had the chance to work with you as one of my mentors while I was doing my post doc at EPP. You were not afraid of tackling challenging real world problems, communicating with subject experts and coming up with insightful comments and suggestions/solutions for policy decision makers. You were very critical but your comments were always right on target and are definitely very constructive. We all benefited from your wisdom. Your leaving is a big loss, not only to your family, but also to your students, the country and the world. I will miss the hard working professor who walked across the campus toward his office every weekend with his poodle. I will miss your window piled up with papers, reports and books. Thank you for teaching me. You will be remembered and will continue to be a role model to me. – Jih-Shyang Shih

You're a card-carrying economist whom all engineers (and all economists!) should spend time with. Amongst the many things I learned from you was the chase for simplicity. When working with you on energy related things, you always brought an economics view not as profits or just welfare, but also incentives. If things don't make sense, things won't get done. When analyzing electric vehicles, you clarified the value of an electric supply chain by asking for (and immediately estimating) the lifetime value of the gasoline put into the car. No capex higher than that would make sense on the first order of magnitude. You were always a firm believer in meaningful, rigorous back of the envelope calculations, something I have striven for (though I sometimes cheat, and use a 8 1/2 by 11 sized envelope). I was never formally your student, but learned extensively from you, even when I was privileged to be your colleague. I hope I can learn not just your multi-domain and diverse skills, but your humor, and your humanity. – Rahul Tongia

Thank you for taking the time to give me feedback on ideas and giving me advice when I needed it. I admire your extensive knowledge and your calm and considerate way of how you analyze things and interact with people. You are and always will be a role model for me. – Gabriela Hug

I will continue to live up to your candid description of my media work—Like Water Over Rock. Never, never give up. – Chris Swaney

Lester, every time I make a presentation, I think of how you showed time and time again that an informative and enjoyable presentation can be accomplished by two hand written slides accompanied by depth of knowledge and interesting anecdotes. – Cary Bloyd

Though I did not have an opportunity to work with you, I learnt a lot by seeing you in seminars. I used to be amazed at how you can concentrate on the most essential aspects of a problem and how you always chose the most appropriate language for every occasion. It is hard to imagine EPP without you. – Hari Chandan Mantripragada

I credit you with expanding my awareness that a multidisciplinary approach is essential in solving many real life engineering problems. Thank you for your openness and collegiality. – Ike Ezekoye

This is what makes you really unique: You were always interested in any type of problem posed, and you immediately got to the bottom of it with your intellectually challenging questions. Your view on issues had an unparalleled analytical sharpness and was full of wisdom. You have been a great advisor to me even long after I finished at the university. I will always remember the lively discussions on a wide variety of topics that we had every time I came to Pittsburgh, and every time after meeting with you I left with new ideas and new perspectives. You will stay in my memory forever, and I will always be thankful to you. – Markus Klausner

You provided me with the opportunity to study at CMU, and you encouraged me to take this chance. Your scientific brilliance, integrity, and outstanding personality had a lasting impact on me and many others. You pushed me hard to do better and taught me that good is not enough. I learned from you how to question things that appear to be understood, and I also learned from you how to challenge others in a positive way. You were a wonderful person, and I will always be thankful to you. – Csilla Klausner

I have to wonder, did you connect the cancers you knew as correlation coefficients to the cancer in your body? Did you apply the calculus of the statistical lives you saved with your work to the definite and particular event of your own death? I wonder how you thought about the fairness of it. Your passing is a reminder of the uncertainty we all live with, a reminder that giants of intellect, such as yourself, are no less fragile than any of us, although we imagine you armored with the weight of respect and accomplishment, shrugging off time as you are able to shrug off critics. I suppose, as intellectuals, we can not really hope for any special protections from the basic impermanence of being human. The best that we can hope for is to leave a legacy of ideas of which we can be proud, and to leave the world a better place for having shared them. That you have achieved this so resoundingly is an example to which I aspire. – Joshua Stolaroff

Although we have been colleagues primarily by marriage (yours to Judy Lave, who is my colleague at Pitt), I have valued our interactions enormously. I lost count of the number of times you helped Judy host some Pitt function or other where I and others benefited from your fantastic wine collection and, especially, your wisdom and insight—both of which you shared so graciously. – Beaufort Longest

Professor Lave was a brilliant researcher, thinker and educator. He introduced many of us to El Nino long before others realized the impact, and kindly remembered his students many years after graduation. What a fantastic

contribution he made to our world, and what a huge loss this is to all of us. – Lisa Haley

Great professor, very interesting class! Will be truly missed!  
– Kfir Catalan

My favorite trait of Professor Lave was that he challenged his executive-level guest speakers as much as he challenged his students. He truly promoted his students and colleagues to engage in non-traditional ideas and intellectual conversation. He will be missed. – Dave Kong

Dr Lave is one of the rare professors where I find myself thinking about something he said a few times a year. From voting blocks, to externalities, to antitrust, it comes up. I had chicken pox on my first final with him and had to take it from home on one of the first laptops ever used at GSIA and I still remember him grading the questions as I submitted them in semi real time as I took the test in what ended up being one of the most valuable “conversations” I ever had. I am saddened by the loss for every future GSIA student. – BTS

My favorite teacher, the world will miss him. My deepest condolences. – Marc Brands

Though Dr. Lester had accomplished so much, he always brought his humility to the classroom. He engaged with us and participated actively in our discussions around government policy, strategy and economic modeling. If people were to take his class and go to Washington, our country would be in a much better shape. – Vinay Mamidi

Dr. Lave was a thought provoking instructor where he would passionately argue an opposite point from what he was trying to teach the class just to have the students understand the reasoning for the proper strategy. He will most certainly be missed. – Samuel Nakhimovsky

I am saddened to hear that Dr. Lave passed away this morning. Dr. Lave was my first encounter with Tepper (then GSIA) when I took my first economics class my Sophomore year in CIT. Later during my 3 years at GSIA, I had the pleasure of listening to lectures by Dr. Lave on his various experiences in government and industry. His humor and contributions will be greatly missed. – Gregg Lebovitz

You will forever be remembered for the insights and knowledge that you shared with us. – Ed Sarmiento

Very sad, but many great memories—a great and creative mind and so much fun to talk to... he was truly influential in helping me learn to appreciate so many different ways to model the world. Thanks so much Lester. – David P. Greene

I am in tears as I write this. Had I known he was seriously ill, I would have made the trip to Pittsburgh to thank him again. Professor Lave had a massive influence on me during my two years at CMU. I recall a session in one of my classes

during which he challenged some of the widely held assumptions about the concept of personal responsibility. From then on I would cast a wary eye on my assumptions whenever I advanced an opinion. During the summer between my first year and my second year, Professor Lave introduced me to researchers in CMU computer science and he asked me for my opinion on what it would take to commercialize the research. It was such a fascinating experience. During my second year, Professor Lave put together a consulting course that would give us the opportunity to work with actual clients—electric utilities. I appreciated the fact that he trusted us. From time to time during my two years at CMU, I would pop into Professor Lave’s office to chat. I was often challenged and inspired during those chats. The truth is I have missed those chats since graduation. – Benjamin Chua

I can only echo what so many others will say, that Lester was inspiring, friendly and kind and that I cannot think of many who better exemplify a life well lived. Lester, you are irreplaceable, but I know that you have helped and inspired many wonderful people. Judy, you have my deepest sympathy and well wishes. – Chantal Brandon

During a business ethics lecture, Prof. Lave told our class to be happy for what we had, where we were, and the opportunities available. In comparing our situation with others throughout the world, he pointed to the simple fact that we were in business school at CMU as proof for making the statement that: “You’ve already won.” That simple thought has stuck with me for the past 10+ years, and I think about it nearly every day. It has kept me grounded, made me more generous, and pushed me to show more empathy in business and personal life. Thank you, Professor Lave. – Jason Rushin

I’ll use the things you taught to make the world better. The summer is the time for your salmon roasted party, I wish I could have that with you again. Please rest in peace. – Sompop Pattanariyankool

Lester Lave was my Ph.D. thesis supervisor during the late 80s. My thesis concerned auto safety belt use—traffic safety was another of his many areas of interest. It was mainly because of his set of interests, which spoke of someone who cared to address significant real-world policy issues that I came to CMU in the first place. I will always remember him with fondness and gratitude. It was a privilege to work with someone of his caliber and stature; it was also a joy to work with someone who was as encouraging, patient, and wise as he was. He has been a model to me in my own supervising of students; his enthusiasm for research, his professionalism and dedication, and his conviction that research could make an impact for good in the world, continue to inspire me. – Eric Latimer

Our thoughts and hearts are with Professor Lester Lave’s family. He was a wonderful person and professor who has

inspired us and helped us be better people. May Professor Lave rest in peace. – Ciro Mello

Will always remember his combination of the theoretical and practical realities—all laced with humor. Classic line was, "If they stop mandating the requirement to wear motorcycle helmets, the average IQ in the U.S. will go up."  
– Gary Sender

Lester and Judy were the faculty my wife, Karen, and I sat with at the welcoming dinner our first day at CMU when I started the doctoral program in 1975. We will always remember the genuine affection and enthusiasm for doctoral students that Lester and Judy both conveyed to us. What a great introduction to this wonderful profession we are in! Since then I've had the honor to work with Judy and to see in colleagues the profound influence that Lester had on them. – John Harry Evans III

For an MBA/public policy dual degree alumnus like me, Professor Lave's core class had the content I might enjoy the most during the program in Tepper. Additionally, because of him, I took the power distributions system's class, where 85% of the material was aimed for those pursuing electrical engineering graduate studies so it was like Chinese for me (by the way, I don't speak Chinese); however, that 15% of the material I learned from Professor Lave was precious. It was an honor for me to have had the opportunity of sitting and listening to Lester Lave's class back in 2006. I'll remember him with great respect and warm appreciation. – Francisco Alanis

I am so very sorry for your loss. Prof. Lave was one of my favorite professors while I attended GSIA. To this day, I quote lessons/ideas learned from him and observations he made. Also, I will always remember taking his final and actually learning something WHILE taking the exam!! I had the wonderful opportunity to go to his home with some other students. I loved seeing all of the memorabilia from his many trips around the world. To this day I look forward to a trip to Prague. God bless Prof. Lave and all of you. My sincere prayers and thoughts are with all of you.  
– Kelley Lynch

As an MBA student with a non-traditional/environmental background, I always felt that Professor Lave understood me in a way that other professors didn't. We didn't always see eye to eye, but I admired his convictions, his love of learning, and his belief that a greener, smarter world is a real possibility. I have thought of him often in the years since I left Tepper, and will continue to do so long into the future. – Alix Bowman

One of the most memorable professors from my time at GSIA/Tepper. I imagine he will be missed by thousands of people whose lives he touched through his work, his teaching, and his life. – Christopher Stengel

I extend my condolences on the sad and sudden demise of Professor Lester Lave. My thoughts and prayers are with

his family, friends and colleagues. I had the opportunity to interact with Dr. Lester Lave recently (over the last couple of years) to seek his guidance on my energy industry focused Intellectual Property development effort. He was supportive and it was valuable to get his feedback and guidance. His departure is a great loss to the Carnegie Mellon community and the industry. He will be truly missed.  
– Meghna Sharma

Professor Lave's classes were my favorites! His sense of humor, intellect and story telling made a lasting impression. He will be missed! – Brad Helfman

Thank you, Professor, for teaching me that the way we choose to see the world is the world we see.  
– Monica Maris-Jakubowski

Lester Lave—what a wonderful man—his legacy will carry on and grow. The price of tea in China just went up.  
– John G. Furjanic

I'm sorry to hear this news. Rachel and I wish you all the best. – John Koutrouba

Made class enjoyable and valuable. – Nick Elliott

Professor Lave was one of the most memorable professors I had during my MBA program at Tepper. He taught his class well and engaged the students in interesting dialog and thought. His warmth was appreciated when he invited the class to his home for a get together. It was great to experience the hospitality of a true home during our two years of transitional living. My deepest condolences for your loss. We will all cherish the many happy memories we have thanks to him. – Kevin Cheung

Professor Lave had a never-ending interest in bringing scholarship and business closer together. He demonstrated this in his research, but it was also visible in the way that he communicated one-on-one. Whenever we would meet on campus he would ask about my family's business—a scrap metal, paper and plastics recycling business that was started over 100 years ago by my grandfather. Because of his work around design for recyclability, Professor Lave fully understood how this company that started as a junk yard had become a vanguard of today's global green movement. Rarely have I met anyone with both such depth and breadth of knowledge. He will be greatly missed. – Cindy Padnos

When you attend GSIA, you could expect a couple of experiences: meeting really smart people, mastering modern business practices, and a very relaxing B\*\*rs after the end of Game. What you don't expect is to meet a professor like Lester Lave. He had an uncommon way of integrating economics, environmental responsibility, and business in such an engaging manner. He was a true thought leader and master of enlightening his pupils.  
– G. Matt Flory

Professor Lave has changed my world. It was my sophomore year when I took his economic course. For me, it was not just a course teaching how to make political and environmental decisions based on economic calculations, but a course taught me how to approach life's many tough decisions with wisdom, with intellect, with the right attitude and right priorities. Professor Lave also showed me how one's intellect can make a difference in the world. I decided to pursue economics as my second major and as my field of graduate studies because I admired his work. And I will continue my work and study in this field. I am only one student of many who has sat in Professor Lave's class. But Professor Lave is the one most important teacher to me. I will always remember his kindness and wisdom. May God bless his family. – Yi Niu

Lester was one of my favorite professors while I attended CMU. His forward thinking fostered a collaborative and engaging atmosphere, even amongst those in opposite spectrums of political and economic thinking. I will dearly miss Lester's leadership, drive and measured approach in what seems to be an ever more politically divisive climate. My best wishes to his family. My thoughts are with you. – Cornelia Woodworth

Professor Lave was a prolific researcher who brought enormous insight and creativity to the classroom. He had a unique talent for generating lively discussion, and cared deeply about his students. I fondly remember the weekend he invited the entire class to his house for pizza and beer, and took the time to speak to every one of us. And despite having moved several times since graduating, I've never been able to bring myself to throw away his (hefty) course packet—he authored a collection of articles that are truly thought provoking and timeless. He will be missed. – Andrew Sutherland

His economics class was among one of my favorites at Tepper. Very interesting and he encouraged good discussion. His classes were places for free discussion, and he never imposed his views on students showing both sides of the story, even when he didn't agree, rather than just pushing one side of politics as many colleges (even CMU) unfortunately push at this time. He made us think, instead of just feeding us information to memorize! He had the entire class to his house for beer and pizza! A great professor and will be missed greatly. My condolences go out to his family and their loss. – Greg Vaslowski

I am saddened by the passing away of Professor Lester Lave, who was a strong source of inspiration to me. I met Lester on the first day of my first semester at GSIA. He and Finn Kydland co-taught a doctoral course in economics for non-econ Ph.D. students that semester. Lester approached the subject in a rigorous but unorthodox manner. Through engrossing classroom discussions and tough assignments, Lester taught us how social phenomena could be modeled formally to gain deep insights and help guide policy. His course opened my eyes to research and inspired me to

pursue it. Rigor, unorthodoxy, energy, and optimism—these were Lester's defining traits. He will be missed. – Vasu Krishnamurthy

My heartfelt condolences to the family. – Rahul Tamhane

I was a Ph.D. student at GSIA from 1983 to 1987. I was associated with him in a variety of teaching help related and research situations. He was the nicest man I had met in GSIA. Even though I had almost no contact with him since 1988 or so, I never forgot his generosity of thought and action. In Fall 2009 my son joined CMU as an undergrad; in the summer of 2009 my family went to visit CMU. I went to Tepper/GSIA on a Saturday looking for him without knowing his office location. Suddenly I find him with a dog like in this picture; an almost identical looking dog used to be with him in 1987. Time stood still. I am so glad my son got to speak to him; it was such a heartwarming experience for me. I am so sad, I can't express it. Goodbye Dr. Lave/Lester. I will miss you very much. – Sanjoy Ghose

Thoughts and prayers to Professor Lave's family. He was certainly a wonderful professor, a brilliant researcher, and a good man. I spent a good amount of time with him while at GSIA and am thankful to have had the opportunity. – Doug Britt

He exuded both kindness and competence, a role model and exemplar for many students, and for many years to come. He will be greatly missed. – Gerard Beenen

Professor Lave's teaching informed my approach to structuring problems for discussions that would engage and inform even the quant-averse in business and government. He helped to point the way for the better in my risk assessment and management. And he was fun to converse with, to boot, having a keen sensibility. (And I admit to being responsible for a pound or two of Balzac's paunch, in spite of the little sign Lester used to hang around his furry neck...). – Albert Johnson

One of the highlights of my experience at Tepper was being able to spend time with Professor Lave outside of the classroom. Like many classes before, he invited us to his home for pizza and beer and it was a refreshingly casual experience outside of the student-teacher formalities. Although instead of learning about energy policy or strategy, we learned about all the places around the world he had been. It was a real pleasure being his student. – Michael Chien

One of the best. I cannot forget his lectures and the discussions about public policy he led during our microeconomics course. He always moved the issues beyond the textbook. – Luis Bobillo

I'll keep this brief (which is far different from the way we debated in Professor Lave's class): I find myself citing this very wise economist over and over again—as recently, I'm

sad to say, as the day before his passing. My involvement with politics was bolstered by his statement that “when government gets involved, everybody loses.” I recall distinctly wanting to prove him wrong. But Prof. Lave taught me that for every expenditure there must be a payer, so that the books balance and so does the social equity. His influence will be missed. With heavy heart, – Jonathon Feit

I never studied with Professor Lave as I already had a B.A. and an M.A. in economics from Netherlands School of Economics in Rotterdam when I entered GSIA. However I have had numerous interesting discussions with him during my years at the school as well as during a couple of reunions. – Hans van Gelder

Even though I wasn't in any of Professor Lave's classes, I remember continuously hearing my colleagues speak about him and his classes. He was definitely an iconic image for Tepper and will be missed! – Mihai Garbea

My friend, Gary Anderson, attended GSIA from 1967-1969. Lester Lave was there, teaching. When I myself was an undergraduate at CMU, Lester taught economics to me in the mid 1970s. When I returned to CMU at GSIA in 1983-1985, Lester was my economics professor. In the 1990s, Professor Lave came to Detroit to lecture the alums about the economics of recycling cars. Even in the past few months, well into the 21st century, Professor Lave was a well loved, brilliant Professor. I can't possibly imagine the number of people he influenced over these decades. What a great man, and one I will remember forever. We have lost a one-of-kind genius. – Michael Salemi

Professor Lave taught me to think in a new way. I always looked forward to attending his lectures. Whether he was sharing his thoughts on why the Squirrel Hill tunnel always backs up or how to solve for sustainable energy, spending time with him was always fun. It saddens me that I can no longer recommend that my friends who are current students take a class with him. While his legacy will live on, there will be no replacement for him. Condolences to his family. – Michael Warshafsky

I still remember the first time that I met Professor Lave and Balzac. Balzac was wandering around the student common area of the old GSIA building with a sign around his neck that read “Don't Feed Me.” Professor Lave was on the couch chatting with students. This image remains with me to this day. I work in a school and I have tried to model my relationships with students after the examples set by Professor Lave. As I look back on my two years at Carnegie Mellon, Professor Lave was probably one of the most influential professors. He encouraged us to take risks, think outside of the box and question. My thoughts are with you at this time. Thank you for sharing Professor Lave with us. – Rahel Green Rosner

Terrific professor and insightful visionary. You will be missed. – Cliff Hamal

A great scholar and teacher of energy studies in economics. I remember taking his first year course at GSIA. – Aditya Waghray

My sincere condolences to the Lave family. Professor Lave was one of my favorite teachers at GSIA, a most memorable and influential man. He is in my prayers, as are you, his family. – Susan Hils Brunner

Professor Lave instructed me a long time ago, but I still remember him. He was a fabulous professor, with a sense of humor as well! I was privileged to study under him. Best wishes to his family. – Linda Duessel

As part of the flex mode program at United Technologies, we didn't have the opportunity to spend as much time with the professors as we may have liked. But even to this day, my former classmates and I will mention Professor Lave and the memorable times we had in his class. We could always look forward to the stimulating dialogue, and it was always very apparent how passionate he was about helping us achieve our best. – Eric Strafel

Lester Lave was ahead of his time—it was a privilege to attend his classes, to listen to his lateral thoughts on complex issues—those issues that most, in an attempt to uncover, would adopt a linear and deterministic view. He influenced my thinking like no other at CMU, and I'm thankful for that, and glad that I acknowledged this decisive influence in my recent book—my humble tribute to a great mind and great man. – Yves Moyon

So sad to hear of your passing, what a great loss to the world. You will always be my favorite professor at Tepper. Also, I would have loved to hear your Last Lecture. – Valerie Pajak Glyptis

I am shocked and saddened by the news of his passing. What a wonderful human being. There are a few people you meet in life that leave a lasting impression, and he is one of them. Professor Lave inspired me to believe that each and every person has the potential to impact our nation and our world. He led by example. I am a better person for having known him. He will be dearly missed. – Sean Bufano

Professor Lave, you were a great inspiration in helping me understand and better appreciate the wonderful mess that is the energy/utility industry. You will be sorely missed. – Don Hourican

I use the lessons of Professor Lave everyday. He taught us how public policy really works, how it doesn't work sometimes, and how to make the information real. He has made a tremendous impact on the world, not only through his research and publications, but also through the education of every student in his class. – Lynlee Altman  
You were a class act Lester. You will be missed. Some of my fondest memories and greatest inspirations at CMU include

you...whether it was in the classroom, your office or the cocktail parties that you and your wife hosted, I always felt welcomed and you talked to me as though you were shaping the next great leader. I hope you spent your last days knowing how many and much you touched and inspired others. – Christine DeFilippo

When I arrived at Tepper in '08, I was determined to start an energy club, an organization to foster the interests of MBA students in the energy industry. As our faculty advisor, Professor Lave was always encouraging, kind, and honest with us, and was the perfect advisor to help us get up and started. We could not have done it without his continuing support and expertise. Thank you Professor Lave and we will all miss you greatly. – Mas Ogiso

Rest in peace, Professor! One of my fondest memories of you is your passion and caring for Balzac, who was frequently around! – B. Schmidt

Lester was an amazing teacher whose class was both fun and thought-provoking. His is one of the few classes that I still think back about, whether to inform decisions or just to ponder when I see something Lester mentioned happen in practice. He will be missed. – Chris Bell

It has been many years since I took Professor Lave's economics class but I distinctly remember how he brought economics to real life. One day in class he remarked that he wished his favorite restaurant in Pittsburgh would double their prices so the lines wouldn't be so long. I am also fortunate that I heard him speak about energy here in Houston within the past 5 years. Again he brought economics to real life by laughing at Senator Frist's proposal to give Americans \$100 to pay for gasoline; a proposal that would increase demand, not stifle it. My condolences to the Lave family at this difficult time. – Mike Davis

It is because of Lester Lave that I chose the career field that I did: energy development. I was always impressed at how well-behaved his beloved dog was during class as well. Thank you for all you did Lester. – Andrew Hegewald

I always admired Prof Lave. He brought the best scholarship to bear on real world problems that have a tangible and immediate impact on our lives. I was surprised that he always remembered me though I had only one class with him. Also loved Coco! – Cassie Ruane

As a Tepper staff member and MBA student, I had the honor of interacting with Prof. Lave on multiple levels. He was a truly remarkable man, the rare combination of an academic genius with a personable educator. True, I will remember how he taught us to be more critical thinkers. True, I have been inspired by how his research has made the world a better place for future generations. Despite all these great things, my fondest and deepest memories will be having the opportunity to spend an evening with

Lester in his home over pizza and beer. The academic, the educator, and most importantly the man will be greatly missed. Lester's legacy lives on in so many of us. My heartfelt thoughts and prayers are with you, his family. God bless. – Jeff Tsai

Professor Lave was generous with his time and genuinely concerned about his students. Although I don't work in public policy, his 5 point test to determine the quality of public policy I use to this day. His approach to public policy and the environment was erudite and forward looking and I am proud to say I have been able to incorporate those ideas into my vocation as an environmental professional. He will be sorely missed, but leaves a tremendous legacy. – Donovan Smith

Professor Lave was that unique professor who forced his students to think differently about the many problems the world faces. My time in his classes was very memorable and created a lasting legacy. He will be sorely missed, not just by The Tepper School, but by the world. – Mike Slusar

I am extremely sorry to hear the news of Prof. Lave's death. Prof. Lave was a great teacher, one of the best, I have had. I met him about three years back when he came to CMU Alumni meeting at UTD. He still remembered us from the first flex-time class and talked about the class. He was a good person and a perfect gentleman. I extend my condolences to his wife and children. May his soul rest in eternal peace. – Tarun K. Basu

When I went to GSIA from 1977-1979 I was lucky enough to have Professor Lave. I was in awe of his intelligence and presence. He will be missed. – John DiLacqua Jr.

I really enjoyed Prof. Lave's class my first year at GSIA. Prof. Lave made you really think about the issues and consider different perspectives. During my second year, we had executives from a cigarette company coming in to do a presentation on the tobacco industry. I stopped by Prof. Lave's office during his office hours to pick his brain. You see—this was before Google and the age of quick instantaneous information—and I wanted to have something intelligent/ interesting to say during the discussion. Even though it wasn't for one of his classes, Prof. Lave took the time to talk with me. The tobacco executives were VERY confident—okay, arrogant—in their product and profits. I still remember the hush that fell over the classroom when I quietly challenged the tobacco executives with a few carefully worded questions about their industry, (that of course Prof Lave's exchange inspired me to craft). At times, it was a TENSE discussion; you could have heard a pin drop. Twenty years later, that sudden quiet hush and surprised looks from my colleagues- still makes me smile. In a roomful of men— a young woman was asking the hard questions. Of course—as a young, 23 year old blonde woman—I wasn't about to let my fellow classmates know I had sought inspiration for those carefully worded questions. But, looking back now—I guess the

fact that I was smart enough to go seek out Prof. Laves advice/ ideas— well, that should count for something; I guess I can tell the story now. I wish Lave would have been there during that class interaction with the tobacco execs. He would have loved it. Prof. Lave was a wonderful, accessible teacher who brought balance to GSIA and I will miss him very much. Warmest Regards, – Molly Stahlman

What a tremendous loss to the Tepper and broader CMU communities. Professor Lave was an excellent teacher and a great man. My thoughts and prayers are with Professor Lave's family during this difficult time. Best regards, – Andy Andrew Barrow

I will never hear the word "emissions trading" without thinking about Prof. Lave and the short time that I had with him. He challenged my thinking and made me open my mind to new possibilities. His class was one of those required classes you kind of dreaded, but through the force of his personality and opinions, he made it one of the most memorable in my experience at GSIA. He makes the "one hand" list of the best professors I had while there. I'm sorry to hear of his passing. I know that his legacy will live on for generations. Particularly my kids... they will know to avoid driving on Friday and Saturday nights as a result of the frightening statistic that I learned from Prof. Lave! – Kurt Lammon

On Herb Simon's recommendation, I took Lester Lave's course in advanced economics, despite not wanting to study Economics any further after a disappointing course as an undergraduate. My first essay, a review of Adam Smith's Wealth of Nations, was a disaster. Lester's comment was more polite, and ended with "I know you can do better." What a stimulation! When I joined the Erasmus University of Rotterdam Business School I was still so impressed by Lester that I tried to persuade to come over for a term, but he was too loyal to GSIA. An honest and thoughtful scholar, who put his mind to where his heart was. I, too, am 71—far too soon. – David Bree, Emeritus Professor, School of Computer Science, University of Manchester

I am saddened by the news that Prof. Lave passed away. Although I do not know him personally, he has been an icon of CMU and Tepper for so many years. I still remember he and his giant poodle used to hang around in the school lobby on weekends. – Jhinyoung Sha

Professor Lave was a true inspiration to all students. The depth of knowledge and encouragement to think well beyond the bounds of conventional understanding in the areas of alternative energy were second only to his personal conviction and practice of those concepts in real, every day life. My limited but inspirational conversations with him led me to take my business in a different direction that led to success rather than the certain obsolescence that has befallen so many U.S. manufacturing companies. He will be sorely missed. It was my sincere pleasure to have met him. – Eric Albert

Lester is a legend and will be deeply missed by all. A scholar and a gentleman he was such a massive credit to CMU and the Tepper School. – Alistair Rock

One of the best Professors at CMU Tepper—a luminary in Economics and Government and Energy policies. You will be missed Prof. Lave. Your teachings certainly had a significant impact on many at CMU, including myself. Regards, – Mayank Dhamija

He was a great person. One of the most impressive educators I've ever had. When I think of my memories from Tepper, he's at the forefront. He will be missed. Sorry for your loss. – John Gordon

Fondly remembered. – Fred Stepanis, Jr.

I have great memories of Lester Lave, my dissertation chair. I learned much about academic lifestyle benefits from him, especially while housesitting for him during my student years. I especially remember his huge and impressive wine cellar. I last heard from him when received a professional award a few years ago. He never lost touch! May he rest in peace, with a smile on his face! – Jane Fedorowicz

I will remember Lester as a dedicated and competent professor. His research has always been policy oriented and aimed at the problems of our societies. He was a humanitarian as well as a scientist. – Michel Truchon

A tremendous individual that inspired many. – Matt Saneholtz

One of the best professors at Tepper, Dr. Lave opened a new window for understanding the energy market and underlying economics. I will cherish his wisdom for ever. – David Chen

I remember Professor Lave as a young, vibrant, friendly man, who was also an excellent instructor, whose classes were always interesting, engaging and very much worth attending. Thank you Professor, for helping to instill in me a life-long love for learning! – Ken Derow

I am now even more grateful that last September I made it back to campus, and I was able to spend some time with Lester. He made a profound impression on me during my stay at GSIA. I will always be grateful for having such a professor—not just as an educator but as a person whom I greatly respected. I am sure he will be sorely missed—especially by all the future students who will miss out having such a gifted educator and superb human being. I would like to send my condolences to his family and friends. – William Meaney

My deepest condolences to one of the most inspiring and brilliant professors I had the privilege of being a student of. My deepest regards. – Tiago Moreira da Silva

Professor Lave was one of the most memorable educators I have had the pleasure of learning from. I currently feel a sense of loss of a great educator before his time and privilege that I was able to learn from him in my two years at GSIA. Soft spoken but always thoughtful in the information he communicated. He clearly cared for his students, that they learn and understand the material that he was so passionate about communicating, yet treated many as if they were his peers. You could always count on him making time to explain something to you as he gave his time generously to all who wanted to learn from him. His warm demeanor and smile will be missed at the school and by his friends and colleagues. Sincere condolences to his family. – Jordan Rosner

I had Professor Lave as a teacher as a 2004 graduate of the Tepper MBA program. I hope his family is incredibly proud of the terrific work he did over his career. While I am sad to hear of his passing, I just hope there can be focus on the extraordinary mark he made on this world.  
– Brent Radcliffe

I was sad to hear of Professor Lave's passing. I first met Prof. Lave when I took his BGS evening course in the fall of 2007. As a flextime student I found the class very engaging and difficult at the same time. The discussions flowed from everyone in the class and the debates were the best. I learned a lot given that everyone voiced his/her opinions. I was surprised to learn from Prof. Lave that the amount of class discussion was not typical. He said we were the best class he had in years. I will also never forget Coco wandering around the classroom. At the end of the mini, Prof. Lave invited my classmates and me to his home for a party. During my 3 years at Tepper, he was the only professor who had a house party. He will be missed.  
With sincere feelings, – Victoria Guscoff

I don't think I realized Lester's impact on me until I learned of his passing and was genuinely saddened at the news. As a dog owner/lover I admired his relationship with Coco. As a man I admired Lester's candor and use of his skills to generate positive social and business impact. Lester Lave was an example of achievement in career and in life.  
– Leonard Coyer

An outstanding professor! he had the right mix of practical thinking and theoretical basis. Although 27 years ago, I vividly remember his style. We pray his soul rests in peace.  
– Hassan Popat

In February I dropped by Lester's office to gauge his interest in applying for the position of our new dean. With a twinkle in his eye and a smile he replied without hesitation that "my time has passed." I was struck by the finality and serenity of his composure and, of course, had no idea of what was to come. That was the last I saw of this great man. – Jeffrey R. Williams

Lester, I miss seeing you and Coco each day. I worked with you when I was in EPP and also had Coco approve our lunch menu before everyone at the seminars ate. She usually approved our choice. Miss seeing your smiling face and good morning each day at Tepper. God bless you for all your hard work with the students and your helpfulness when I asked questions. – Dolores Matthews

Lester Lave was my mentor and I miss him terribly. He is a primary reason that I returned to the Tepper School to manage the finances and business operations; his drive to solve problems was contagious. When working on weekends, I would regularly stop down to his office for guidance—probably too often, as I knew he would be working. Lester Lave was a University Professor unlike any other—approachable with an ability to see the big picture, respectful of people with a calming approach, yet at times, he treated me like a son. – Ted Curran

I talked with Lester on occasion, and solicited his advice a number of times. I can recall that the last time I asked him for advice on an administrative manner, the comment that stuck in my mind was to the effect, "Whatever you do, make it big." Lester liked home runs, not singles and doubles and half measures. – Mark Fichman

I am a secretary here and I first really noticed Professor Lave when he brought his gigantic poodle in. I love animals, and he was very nice about allowing me to pet his dog. We had many small conversations over the back of one of his dogs, and I thought it was great that he brought the dog in with him. He seemed like a very nice man. – Barbara Carlson

I was struck by the depth of Lester's conviction that universities and CMU/Tepper in general, had an important role to play in the betterment of society. He truly, and convincingly, felt that as academics we had an opportunity, and responsibility, to make the world a better place. And he lived this conviction out.  
– Allan Scheller-Wolf

When I first starting working at the Tepper School, my husband asked me if I could help him find a speaker for an annual Supply Chain and Logistics Conference for the company where he worked (it was the H. J. Heinz Company). They were looking for a speaker who could talk about the fuel issues going on at the time. I did not know Lester that well at all, but I knew he would be perfect for this conference, so I asked him. He didn't think twice about. He told me he would be happy to do it and I put him in touch with the logistics division staff that was putting the program together. They loved him and after the conference they all took photos with him and sent them to me. I will never forget that he did that for me.  
– Martha Sproul

Lester was a good person with a wonderful heart and a beautiful mind. He was kind, gracious, respectful, caring, thoughtful, trustworthy, dependable, and interesting. Lester loved being a professor. He was a passionate believer in and supporter of the Tepper School. He worked tirelessly for the school and significantly enhanced its reputation. I miss my good friend Lester. – Ken Dunn

Lester Lave was my undergraduate economics adviser in the 70s and a trusted adviser for executive education since my return to Carnegie Mellon in the 90s. A couple of years ago, I showed him an internal memo that he wrote on my behalf in 1975. His response: "your record keeping is better than mine." I still keep the letter. – John Lankford

Lester, I relied on your insights and wisdom in all of our conversations, meetings and correspondence. Thank you.  
– John Mather

Professor Lave's perpetual gentlemanliness made him a staff favorite. His emails always began "Dear Deb." His greetings in the hallway always had characteristic cheerful lilt, "Well, hellooo, Deb!" I cannot think of an instance in which he declined one of our requests, always quick to agree to a last-minute media interview, photo shoot or marketing project. He made our jobs easier, and he made our work better. To be recognized both for renowned intellect as well as gracious spirit is the mark of a class-act. And, Professor Lave was, indeed, that. – Deb Lantz

I always enjoyed watching Lester conduct interviews with the media because I always learned something. He was a master at explaining complex issues using language and examples that were easy to comprehend and he was an exceptional teacher of how to analyze and position issues relating to public policy. – Mark Burd

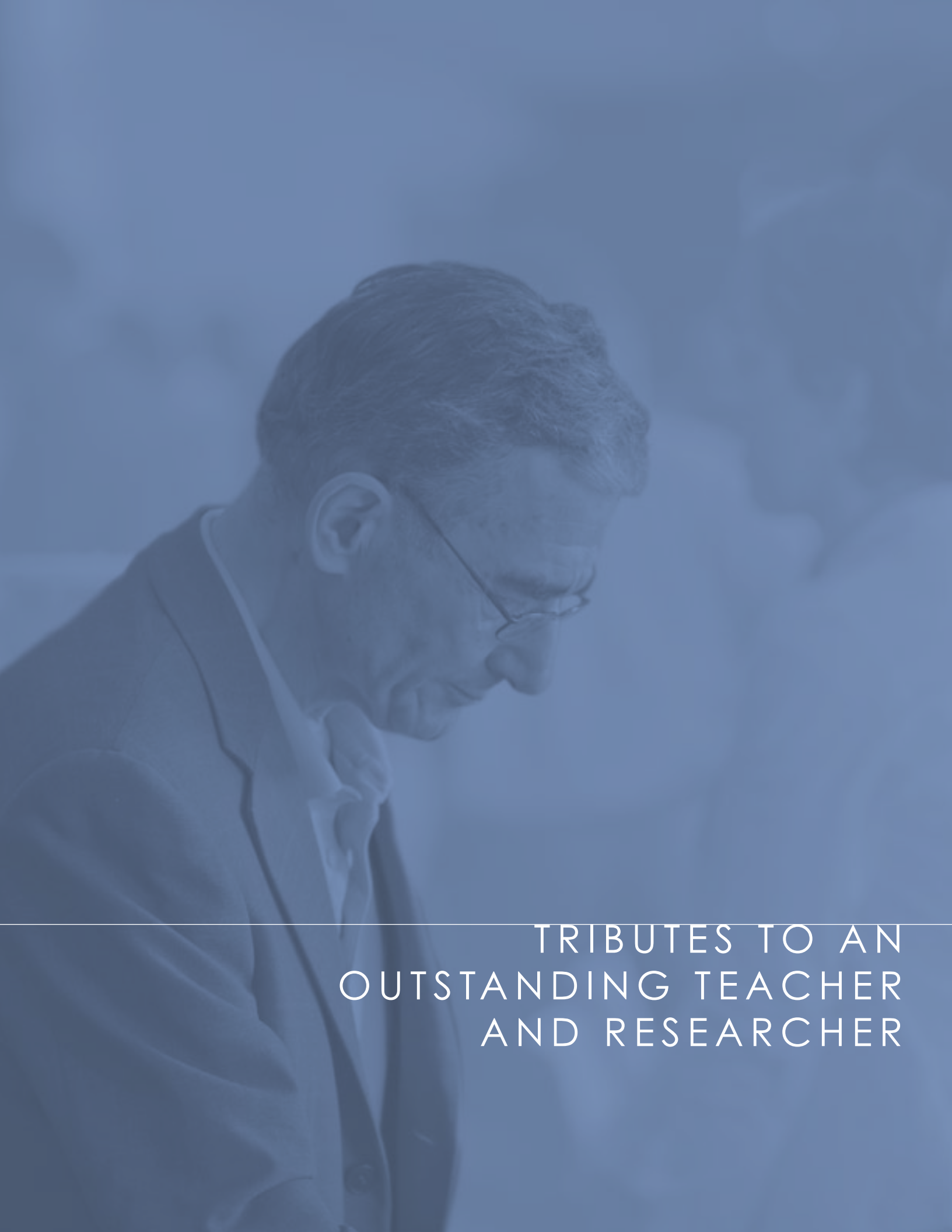
I will always remember Lester's kindness and always making time in his busy schedule for students, faculty and staff. It did not matter that there may have been three or four students waiting to see Lester during an afternoon. The students would wait very patiently in my office; in chairs and on the floor for their precious time with Lester going over their ideas for the projects. – Patty Porter

I didn't know Lester that well, but I know that any man who works on their computer sitting on the edge of their chair while allowing a dog to occupy the remaining 98% of it is a man of great kindness and character.  
– Maureen A. Kowalski

Like water rushing down the river rapids we may be parted by a rock, but in the end we will be one again. (Emperor Sutoku 1119-64 from One Hundred Poets, translated by Peter McMillan) – Yuji and Tomo

I first knew Lester only as Tee and Jonathan's dad. My memories of him from that time are woolly. I knew he was an economist, but I'm not sure I knew what an economist was. I remember he ate a lot of fish and that once there was a picture of him lifting weights in the CMU magazine. I remember thinking at first that he was remote, a little distant, then being struck one night by what seemed like a genuine interest in something I'd said. I remember an ease about him—and him with Judy and Judy with him—that convinced me they were very happy together. I remember Tee and Jonathan revered him. I then knew Lester as the first adult in my life after college who, despite many reasons to do the opposite, took me seriously. We'd crossed paths again through Tee. I had dropped out of a Ph.D. program in philosophy and just spent a year working an isolated farm where I thought I'd write a novel. I'd returned to Pittsburgh with no novel and no idea what to do with my life. For no reason I can imagine other than a general belief in the potential of his children's friends, Lester challenged me to help him fund research on public perceptions of the causes and consequences of climate change. He introduced me as his (and their future) colleague to Baruch Fischhoff and Granger Morgan. He took me seriously and helped me begin to see how to do the same for myself. Lester was a genuine, generous, wonderful man. – Tom Smuts

Dear Lester—This is my third attempt to say Goodbye. Every time I try the words escape me. I think that this is because I am still trying to come to terms that I can't simply call you and come to see you. As I am returning from my sabbatical, it is like coming back to the truth I do not want to face. So, as usual, I will try to make it a bit longer, and I know that you will help me once more to translate it. I wanted to thank you first of all for being a patient listener and interpreter of questions, which ultimately led to the long-lasting clarifications in my mind. I enjoyed tremendously working together on our Annual CMU Electricity Conference. I enjoyed our course and the challenge of teaching it together to a mix of engineers and MBAs. Perhaps the biggest lesson I took was that when it gets almost impossible to bridge the fields, there is always hope and there is someone else who strongly believes that it is not good enough to stay in your own silo. I know that our EESG students admired you as well for having helped us. Many of them told me how stunned they are by your departure. There is a lot of unfinished work we started. I will try my best to carry on. You will always be present in my mind when I try to say something, which after a few sentences loses people who are not intimately close to the subject. I will ask myself how would Lester say this clearly and simply so that I even understand it in a very new way.  
– Marija Ilic



TRIBUTES TO AN  
OUTSTANDING TEACHER  
AND RESEARCHER



## Lester Lave, Visionary Economist

Jay Apt,<sup>†</sup> Chris T. Hendrickson,<sup>\*,‡</sup> and M. Granger Morgan<sup>§</sup>

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Lester B. Lave, a leading applied economist on the faculty of Carnegie Mellon University, passed away at his home on May 9, 2011. This was a major loss to all of us who knew him and to the entire *Environmental Science & Technology* (ES&T) community. It may seem odd that an economist working primarily in a business school could be so important to the ES&T community, but Lave was both prolific and visionary with his interdisciplinary contributions. This perspective is intended not to provide a complete biography of Lave, but to appreciate the inception and role of his interdisciplinary contributions to ES&T.

Lave first came to international prominence with his work on the health effects of fine particulates. His 1970 regression results with his student Seskin<sup>1</sup> established a link between fine particles and mortality. This scientific link was at the junction of epidemiology and atmospheric science: an initial example of what would be Lave's life-long pattern of interdisciplinary contributions. Lave's work inspired others in atmospheric science, economics, and epidemiology to work on the link between air quality and health effects. Another continuing characteristic of much of Lave's work was also illustrated by this early study: the results were vigorously contested by parties with a stake in the existing situation and the existing state of conventional wisdom—in this case industrial polluters. Lave's findings have

been fully supported by subsequent research. Eventually, particulate air quality standards and emission regulations were introduced and they are saving lives. Lave was recognized for his air pollution and public health work with election to the Institute of Medicine of the National Academies in 1982.

At the same time Lave was working on the health effects of air pollution in the 1970s, he also continued work on transportation systems (notably automobile safety, congestion, and waterway operations) and medical care costs and efficiency. The latter work was often undertaken with his spouse, Dr. Judith Lave, who is a notable scholar in her own right on the faculty of the School of Public Health at the University of Pittsburgh.

In 1973, Lave published an initial paper on the health effects of power generation.<sup>2</sup> His interests in electricity generation organization, processes, and regulation continued for nearly forty years, with early work on alternative fuels and health effects. This interest developed into an ambitious concern for restructuring the entire energy use system in the United States. With technical colleagues Granger Morgan, Alex Farrell, and Jay Apt, he founded Carnegie Mellon's Electricity Industry Center in 2001, which today is the largest interdisciplinary group working on all aspects of the electric power industry.

During the 1980s, Lave became a seminal contributor in the developing risk analysis arena, with a particular interest in balancing environmental and other risks with economic and social objectives. Automobile safety, dam design, diabetic truck drivers, fuel additive risks, and global climate change were but a few of the topics addressed in research by Lave and his students. With Omenn, he did landmark work on testing of toxic chemicals showing that testing on rats and mice was a poor way to predict effects in humans.<sup>3</sup>

Interdisciplinary activity need not all be outreach. Welcoming outsiders into your own discipline is a contribution as long as the outsiders have something to contribute. Engineers Hendrickson and McMichael first interacted with Lave as a result of a comment on his published paper in the *American Economic Review*.<sup>4</sup> The comment read:

Lave noted that Congress typically pursues externalities with a 'one at a time' strategy. He suggested that both the legislature and regulatory agencies would be better served by considering the general cost effects of specific regulations... We suggest an extension to Lave's argument and analysis. In essence, we note that physical or technical constraints often exist on the production and control of

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particular unwanted by-products... Maximization of social welfare becomes a constrained problem, and regulatory policies should consider cross-media effects in such cases.

Economists are generally noted for being argumentative. Hendrickson and McMichael wondered at the reception this technology constraint argument would receive, but Lave was remarkably open to this “outsider” insight.

With Hendrickson and McMichael, Lave founded the Green Design Institute at Carnegie Mellon in 1992. This interdisciplinary center provided new approaches to pollution prevention and waste minimization. With numerous students, the group developed an input–output approach to make environmental life cycle assessment both consistent and rapid.<sup>5</sup> They also had their share of controversy, such as their study of lead emissions from the life-cycle of lead-acid battery powered vehicles.<sup>6</sup> The American Metal Market review of the 1995 lead markets noted<sup>7</sup>

During 1995 there were a few major events that affected the lead market in one way or another. In May, three professors from Carnegie Mellon University [Lave, Hendrickson and McMichael] issued a report, which appeared in the *The New York Times* and eventually the journal *Science*, entitled ‘Environmental Implications of Electric Cars.’ This article disparaged the use of lead-acid batteries and production of primary and secondary lead due to what they said are harmful emissions...

While Lave published extensively in the peer reviewed literature, he has also been a regular contributor of opinion/editorial pieces and legislative testimony. His goal was to have widespread impact, yet he respected the restraints of the peer-review scientific process. He served on, and chaired, numerous study committees of the National Academies (NRC). Most recently he chaired the Academy report *Real Prospects for Energy Efficiency in the United States* that demonstrated large opportunities for saving energy by improving buildings.<sup>8</sup> At the time of his death he was chairing an Academy committee on whether and how to make motor fuels from biomass.

Lave was a dedicated educator. He supervised roughly 40 Ph. D. and postdoctoral students, many of whom have gone on to make important contributions of their own in environmental science and technology. Many of the MBA students he taught have played important roles in the greening of U.S. and international industry. CEOs of several of the nation’s best-managed companies are his former students. He offered one of the first university courses on the economics of the environment. A long-time accomplished practitioner of benefit–cost analysis, in 1996 he wrote a scathing critique of the method that argued that “the foundation of benefit–cost analysis is flawed: the tool cannot provide what some economists claim. Even if the technique might be valid when implemented by a master with unlimited time and resources for analysis, it is a problematic tool in practice when resources are extremely limited, time is short, and people with little training or experience do the analysis.”<sup>9</sup> This was at a critical time, when benefit–cost analysis was being used as a blunt weapon to cripple environmental regulations.

Lave was prescient in picking important problems and applying rigorous analysis. He was also exemplary in ignoring disciplinary boundaries. As a result, his legacy in a variety of important topics is enormous.

## ■ AUTHOR INFORMATION

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# The New York Times

May 16, 2011, 3:05 pm

## Lester Lave – An Appreciation

By Andrew C. Revkin

David Keith, a University of Calgary researcher focused on carbon, climate and energy technology and policy, sent a note last week alerting me to the death of Lester B. Lave, an environmental economist at Carnegie Mellon University who had been a mentor, colleague and friend of his.

Lave had an extraordinary aptitude for letting data lead the way in considering risks and benefits of activities with impacts on the environment or health.

I invited Keith to send an appreciation of Lave. He ended up co-writing the resulting piece with Jay Apt, a colleague of Lave's at Carnegie Mellon, and Joule Bergerson, who pursued her doctorate under Lave and (along with Apt) collaborated with Lave on many papers and is now on the faculty at Calgary. Here's their post, with individual reflections of each of the three contributors set off in italics:

Lester B. Lave, one of the nation's leading economists, died May 9th at his home in Pittsburgh. He was 71.

Before he was 30, Lester and his student Eugene Seskin used the tools of applied economics to demonstrate that air pollution in American cities was causing a significant increase in death rates. That groundbreaking publication in *Science* landed him on Richard Nixon's enemies list. But on the last day of 1970, Nixon signed the Clean Air Act into law, creating the Environmental Protection Agency. Lave and Seskin's analysis served as a key early basis for E.P.A. regulations to improve air quality.

More than two decades later the Harvard Six-City Study of 1993 would remove serious grounds for doubting that roughly 1 percent of all deaths in the U.S. come from small-particle air pollution. Lester's early study laid the methodological foundation for these later studies. As an economist, he had made a major advance at the junction of epidemiology, atmospheric chemistry and public policy.

*David Keith: Academic energy and environmental research is afflicted by far too many true believers. Folks who just 'know' the answer is more efficiency, more nukes, more solar, more carbon capture or more whatever. More than anyone else, Lester provided my ideal at balancing the sometimes opposing drives to help make the world better while holding fast to the academic ideals of dispassionate rigorous analysis.*

While whizzing through Harvard's economics Ph.D. program in three years, he decided that he would dedicate his career to applying tools developed in economics and risk analysis to problems that profoundly affect the lives of millions of people. Abstract theories were fine, but he

wanted to work on problems that affected life and death. Lester jumped into a new problem about once a decade. He had an outstanding ability to choose important problems, perform careful analysis, and present results that questioned conventional wisdom. A former president of the Society for Risk Analysis (1985-6), much of his research focused on the problems of balancing environmental and other risks with economic and other social objectives. Global climate change, dam safety, and the environmental effects of fuel additives were but a few of the topics addressed by Lave and his students.

He had a voracious curiosity, and an unbending commitment to hard-nosed transparent analysis. He loved learning about technology like thermal energy storage for buildings, but love of technology did not turn his head, he was absolutely unflinching in showing that the space it required could produce more revenue in rent than it would save in energy costs.

*Jay Apt: Lester had a nose for what was important and he encouraged his colleagues to write clearly, saying "Don't hide your light under a bushel basket." Some years ago I had produced a result that he thought was interesting, but I'd been stymied for a month by not being able to represent the data in a compelling graph. He pushed me by asking me in front of a small conference to show the messy data, knowing it would get me worried about being scooped. I came up with the right graph a day later. He was always able to get the best thinking out of those around him by asking the right questions, and always made them feel enriched and empowered by the process. He was the best person on our faculty to give career advice. There are probably a hundred successful people who owe their careers to Lester's advice, always given without varnish but with respect.*

With Gil Omenn he did landmark work on testing of toxic chemicals that resulted in a paper in *Nature* showing that testing on rats and mice was a poor way to predict effects in humans. In 1982, in recognition of his many contributions to environmental and public health, Lave was elected to the Institute of Medicine (one of the three arms of the National Academy of Science). He served on, and chaired, numerous study committees of the National Academies (N.R.C.). Most recently he chaired the Academy report "Real Prospects for Energy Efficiency in the United States" that demonstrated large opportunities for saving energy by improving buildings. At the time of his death he was chairing an Academy committee on whether and how to make motor fuels from biomass.

In the 1990s Lester, and colleagues Chris Hendrickson and Francis McMichael, analyzed California's plans to require the adoption of electric cars that would use lead-acid batteries. Their life cycle analysis found that in recycling the batteries from such cars, more lead would be released into the environment than if the cars burned leaded gasoline. While vigorously disputed, these results were ultimately vindicated, pushing California and the nation toward better polices for clean cars.

*Joule Bergerson: I use this example at the beginning of many talks about life cycle assessment. It is a classic and relevant example that shows the potential for unintended consequences when crafting and implementing policy and the urgent need for this type of analysis.*

He offered one of the first university courses on The Economics of the Environment, and in 1996 he wrote a scathing critique of benefit – cost analysis that argued that “the foundation of benefit-cost analysis is flawed: the tool cannot provide what some economists claim. Even if the technique might be valid when implemented by a master with unlimited time and resources for analysis, it is a problematic tool in practice when resources are extremely limited, time is short, and people with little training or experience do the analysis.” This was at a critical time, when benefit-cost analysis was being used as a blunt weapon to cripple environmental regulations.

For the past 15 years, Lester devoted much of his attention to two problems: green design and improving the electricity system. He helped to found and run Carnegie Mellon's Green Design Institute, which has focused on finding environmentally acceptable ways of manufacturing, using, disposing of, and recycling products. As part of that effort, he helped to build a new systematic economy-wide approach to life cycle analysis. He co-founded and built Carnegie Mellon's Electricity Industry Center, which today is the largest interdisciplinary group of its kind working on all aspects of the electric power industry.

A greatly-loved teacher, he counted among his students CEOs of some of the nation's best-run companies.

*Joule Bergerson: The link between a Ph.D. student and his advisor is a cornerstone of academic life. Lester's impact on my life and research has been profound and his impact continues to be felt as I now begin to advise my own students. Upon reflection, there was no single piece of pivotal advice that left an impression. Instead, it was an intuition and approach to problems that permeates my current research and support of the students I now advise. As I talk with students I am guided by Lester's patient and supportive responses to my questions and concerns. As I look for new research questions I hear Lester's advice to focus on the problems where well-structured, transparent analysis can make a big impact. The other day I was talking with a master's student researching Ph.D. programs. My advice to him was that the programs and universities are important considerations. However, what is absolutely critical is finding the right advisor. The relationship with your Ph.D. advisor can be one of the most important in your life. You need to feel comfortable having them in the back of your head for the rest of your life. I will cherish Lester's voice always.*

With the exception of five years at the Brookings Institution in Washington, Lave spent his entire professional career at Carnegie Mellon University, during which he published or contributed to 28 books and over 400 professional and

other publications and supervised 40 Ph.D. students and postdoctoral fellows. One of his students wrote him recently that he epitomizes all that is good about academia: the sharp intellect, the complete lack of pretense, the honesty and integrity and brilliance with which he analyzed every problem, and a body of scholarly work that has actually saved lives.

Lester cultivated the ability to see other viewpoints with humility, and without rancor. When we read daily that there is no truth except what extremists want to believe, Lester Lave's approach to life is an inspiring refutation and a guide to everyone who wants to change the world.

## Pittsburgh Post-Gazette

Tuesday, May 10, 2011

*Lester B. Lave / Carnegie Mellon Economics Professor and Visionary Researcher*  
By Dan Majors

Lester B. Lave, a faculty member at Carnegie Mellon University for almost 50 years, was drawn to the challenge of complex problems. Whether it was global climate change or the health of Pittsburgh's rivers, dam safety or truck drivers with diabetes, Mr. Lave found them all fascinating.

“He didn't want to waste any time on problems that he didn't think were important,” said Jay Apt, a former astronaut and fellow CMU professor. “Lester liked to shine a light on what were thought to be murky problems.”

Mr. Lave, one of the nation's leading economists and a pioneer in establishing the link between pollution and public health, died of cancer Monday at his home in Shadyside. He was 71.

Born in Philadelphia, Mr. Lave grew up in Southern California. He studied economics at Reed College in Portland, Ore., and Massachusetts Institute of Technology in Cambridge before earning his doctorate at Harvard University in 1963. Upon graduating, he became an assistant professor of economics at Carnegie Mellon. He served as head of the economics department from 1971 to 1977. His background in economics, however, was just one of the tools he employed. He schooled himself in engineering and physics in order to understand the important problems that affected society.

He first rose to prominence in the 1970s, when he and a doctoral student, Eugene Seskin, used statistical methods to demonstrate that air pollution in American cities was causing a significant increase in death rates. Their book, “Air Pollution and Human Health,” was vigorously contested by industry, but the findings were supported by subsequent research and served as an early basis for environmental regulations.

“That was a phenomenal achievement. The first quantitative proof that air pollution and human health were linked,” Mr. Apt said. “It upset some people, but he loved it. He felt that if

he was doing important work and it was right, if it happened to get other people upset, well, that was just the way it was."

"He had pretty thick skin," said Granger Morgan, head of CMU's department of engineering and public policy. "He didn't go looking for controversy. He went looking for important problems. He would encounter controversy because there were often very powerful interests at stake in these issues. "But he was not anti-industry. He worked for the auto industry. It's just that he believed in doing serious analysis and following it where it would go, rather than choosing the answer before he started."

In recent years at CMU, Mr. Lave devoted much of his attention to two problems: green design and the improvement of electricity systems. He helped found and served as director of CMU's Green Design Institute and founded the university's Electricity Industry Center.

He also was founder of a field of study called "life-cycle assessment," said Cliff Davidson, a civil and environmental engineering professor at Syracuse University, who spent decades with Mr. Lave, first as an undergraduate at CMU, then as a professor.

"I think this was perhaps his greatest contribution," Mr. Davidson said. "Take, for example, when you buy a car. Lester said we shouldn't just be looking at the car's pollutants, but the pollutants involved in building the car, the steel, the tires. And when the car is at the end of its useful life, it goes into a landfill, where it might contaminate soil and groundwater. Lester was the one to say, we can't just look at the pollution coming out of the tailpipe. We have to look at the automobile from cradle to grave.

"Lester was a remarkable individual. Very much a forward thinker and definitely ahead of his time. He had visions for research in many different areas."

"He was world-renowned for taking chances and going against conventional wisdom," said Scott Mathews, a student of Mr. Lave's in the early 1990s and now a CMU professor of engineering and public policy. "But he told you none of that and didn't act like that. When you walked into his office, you were the most important thing.

"He taught us that if you're making the easy decision, it's probably a short-term decision. The good, hard decisions, the ones that are going to benefit you over the long term, often means taking risks and not doing what everybody else is doing and what everybody else is telling you to do."

Mr. Lave also was an adjunct professor at the University of Pittsburgh and a senior fellow with the Brookings Institution. He was the author of more than two dozen books and countless articles, and served as a board member, director and consultant to a number of national institutes, academies and councils.

"He did good, clean, straight analysis," Mr. Morgan said. "His work will go on. Doctoral graduates will continue to work on

the same kinds of problems. His legacy is the impact through his students and the new ways they'll think about important problems."

Mr. Lave is survived by his wife, Judith; two children, Jonathan M. Lave of Washington, D.C., and Tamara R. Lave of Miami; two grandchildren; and a sister, Carol Kaufman.

Donations may be made to a charity such as the Pittsburgh Symphony Orchestra.

## Carnegie Mellon University

*CMU Professor Lester Lave Was A Leading Environmental Economist He Analyzed Risks That Affect Millions of People*

PITTSBURGH—Carnegie Mellon University Professor Lester B. Lave, one of the nation's leading environmental economists, died at his home in Pittsburgh today, May 9, 2011, after a four-month struggle with cancer. He was 71.

Lave was a University Professor—the highest distinction a faculty member can achieve at Carnegie Mellon—the Harry B. and James H. Higgins Professor of Economics at the Tepper School of Business, professor of engineering and public policy, director of the Green Design Institute and co-director of the Carnegie Mellon Electricity Industry Center.

"Lester Lave was an icon at Carnegie Mellon, where he had achieved the highest plateaus in scholarship and friendship," said Mark S. Kamlet, provost and executive vice president at Carnegie Mellon. "His work transcended many fields, most notably in areas of risk, the environment and economic decision making. The world has been changed by his work; a claim that not many can make. A multitude of friends worldwide are left behind but his work continues through these same colleagues and friends, as well as his former students."

"Lester was a remarkable professor, researcher and colleague," said Robert M. Dammon, dean of the Tepper school of Business. "He was a beloved teacher and a prolific scholar, admired by his students, academic peers and policy-makers. He created a body of meaningful research, placing him among the world's most respected thought-leaders on global energy issues and public policy.

"He was a trailblazer at Carnegie Mellon, deepening and expanding collaboration across the university campus. His work brought together outstanding individuals from many different academic disciplines and is an inspiration to his students and colleagues," Dammon said.

Lave spent most of his career at Carnegie Mellon applying tools developed in economics and risk analysis to problems that profoundly affect the lives of millions of people. Lave first came to international prominence in the 1970s when, together with his student Eugene Seskin, he used statistical methods to demonstrate that air pollution in American cities

was causing a significant increase in death rates. While these results were vigorously contested by industry when they first appeared, the findings have been widely supported by subsequent research, and they served as a key early basis for EPA regulations to improve air quality.

Lave had an outstanding ability to choose important problems, perform careful analysis, and present results that questioned conventional wisdom. Much of Lave's research focused on the problems of balancing environmental and other risks with economic and other social objectives. Global climate change, dam safety, truck drivers who have diabetes, and the environmental effects of fuel additives were but a few of the topics addressed in research by Lave and his students.

"Throughout his career, Professor Lave has made substantial contributions to advancing environmental science, policy and regulator approaches in the United States and worldwide," said David A. Dzombak, the Walter J. Blenko Sr. Professor of Civil and Environmental Engineering and faculty director of Carnegie Mellon's Steinbrenner Institute of Environmental Education and Research. "In addition to using his powerful intellect, creativity and communication skills to make research contributions, he has used these same gifts to bring research developments and new thinking about environmental stewardship to the public realm."

In the 1990s Lave, and colleagues Chris Hendrickson and Francis McMichael, analyzed California's plans to require the adoption of electric cars that would use lead-acid batteries. Their life cycle analysis found that in recycling the batteries from such cars, more lead would be released into the environment than if the cars burned leaded gasoline. While vigorously disputed, these results were ultimately vindicated, and helped California and the rest of the United States move toward better policies for clean cars.

Lave did his undergraduate work in economics at Reed College in Portland, Ore., where he graduated Phi Beta Kappa. He earned his Ph.D. in economics at Harvard University. He often collaborated in research on health care delivery with his wife, Judith—also a Harvard-trained economist—who is a professor at the School of Public Health at the University of Pittsburgh.

In 1982, in recognition of his many contributions to environmental and public health, Lave was elected to the Institute of Medicine (one of the three arms of the National Academy of Science). He served on, and chaired, numerous study committees of the National Academies, and most recently chaired the academy report "Real Prospects for Energy Efficiency in the United States," which demonstrated large opportunities for saving energy by improving buildings. At the time of his death he was chairing an academy committee on whether and how to make motor fuels from biomass.

For the past 15 years, Lave has devoted much of his attention to two problems: green design and restructuring

and improving the electricity system. He helped to found and served as director of Carnegie Mellon's Green Design Institute which has focused on finding environmentally acceptable ways of manufacturing, using, disposing of, and recycling products.

With colleagues Chris Hendrickson, Scott Matthews and Mike Griffin he helped to build an economy-wide approach (EIO/LCA) to "life cycle analysis." With colleagues Granger Morgan, Alex Farrell and Jay Apt, he founded and built Carnegie Mellon's Electricity Industry Center, which today is the largest interdisciplinary group of its kind working on all aspects of the electric power industry. With Marija Ilic he pioneered a course that brought together MBAs and engineers to study how best to improve the power system.

A greatly loved teacher, he counted among his students CEOs of some of the nation's best-run companies. He also was the primary mentor of 40 doctoral students who have gone on to successful academic careers.

With the exception of five years at the Brookings Institution in Washington, Lave spent his entire professional career at Carnegie Mellon, where he published or contributed to 28 books and more than 400 professional and other publications.

He served for eight years as the head of Carnegie Mellon's Department of Economics. His academic appointments spanned the Tepper School of Business, the Department of Engineering and Public Policy in the College of Engineering, and the H. John Heinz III College's School of Public Policy and Management.

Lave is a past president of the Society for Risk Analysis and has served on many committees of the National Academies of Science and Engineering, the American Association for the Advancement of Science, the American Medical Association, and the Office of Technology Assessment. He also is a founding member of Pittsburgh's Group Against Smog and Pollution.

In 2010, Lave received the Prestigious Richard Beatty Mellon Environmental Stewardship Award from the Air and Waste Management Association. The award is given to an individual whose contributions of a civic nature have aided substantially in pollution abatement and for developing increased interest for the cause of air pollution control and waste management for the betterment of the environment.

Lave is survived by his wife, Judith, their two children, Jonathan M. Lave of Washington, D.C., and Tamara R. Lave of Miami, Fla., and two grandchildren. The family asks that in lieu of flowers contributions be made in his name to a charity such as the Pittsburgh Symphony Orchestra. Funeral arrangements are not yet complete.



United States  
of America

# Congressional Record

PROCEEDINGS AND DEBATES OF THE 112<sup>th</sup> CONGRESS, FIRST SESSION

MAY 25, 2011

## *House of Representatives*

*Remarks by*

*The Honorable Michael F. Doyle*

*Lester B. Lave*

Mr. Speaker, I rise today to celebrate the life of Carnegie Mellon University professor Lester B. Lave, who passed away on May 9<sup>th</sup> at the age of 71.

Dr. Lave spent most of his career at CMU, where he distinguished himself as one of the world's most influential contributors to economics and environmental science.

In addition to his title as University Professor, the highest distinction a faculty member can achieve at Carnegie Mellon, Dr. Lave served as the Harry B. and James H. Higgins Professor of Economics at the Tepper School of Business, director of the Green Design Initiative, and co-director of the Carnegie Mellon Electricity Industry Center.

In a career that spanned more than 40 years, Dr. Lave tackled some of the most important questions relating to health, safety, energy, and the environment. By applying principles from economics and risk analysis, he performed ground-breaking research on a wide range of topics including global warming, automobile and transportation safety, dam safety, and the environmental effects of fuel additives.

Dr. Lave first gained attention from scholars and policy-makers in the 1970's when he and Eugene Seskin published research showing that air pollution was linked to increased death rates in American cities. Lave and Seskin's work was highly controversial. But it was supported by further research, and we now know that approximately 1 percent of all deaths in the United States stem from small-particle air pollution. This research later served as a basis for EPA clean air regulations.

Among other significant studies he performed throughout his career, Dr. Lave and his colleagues showed in the 1990's that electric cars run on lead-based batteries were actually more harmful to the environment than cars that burned leaded gasoline. In recent years, his work focused on green design and improving the electricity system. Along with his colleagues, he helped found the Carnegie Mellon Electricity Industry Center, which is the largest electric power research group of its kind.

In addition to teaching and researching at CMU, Dr. Lave was a senior fellow at the Brookings Institution. In 1982, he was elected to the Institute of Medicine, and in 1985, he was named president of the Society for Risk Analysis. Dr. Lave served on and chaired numerous committees of the National Academies, where he most recently oversaw a study entitled "Real Prospects for Energy Efficiency in the United States."

As a CMU professor, Dr. Lave served as the economics department chair for eight years and served as the primary mentor to 40 doctoral students.

Dr. Lave is remembered by his colleagues and students as a caring teacher and untiring researcher who was dedicated to objective, thorough analysis. He should be remembered by this nation as a talented researcher whose body of work has improved U.S. public policy markedly and will continue to do so for years to come.

I want to take this opportunity to express both my sincere admiration for Dr. Lave and my condolences to his wife, Judith, and his two children, Jonathan and Tamara.

## From the Members of Lester's Last NRC Committee

Over the course of his career, Lester participated in and chaired many committees of the National Research Council. For example, he recently completed chairmanship of an extremely influential report *Real Prospects for Energy Efficiency in the United States*, which was part of the Academies flagship study on America's Energy Future. At the time of his death, he was serving as chair of the NRC Committee on Economic and Environmental Impacts of Increasing Biofuel Production. A few weeks before his death, Lester was still dictating editorial revisions to the Executive Summary of that report from his hospital bed.

*In recognition of his contributions, the Committee has dedicated the report in his memory and offered the following statement:*

Members of the NRC Committee on Economic and Environmental Impacts of Increasing Biofuel Production feel privileged to have served on a committee that Lester led from January 2010 until his passing. Lester served on many National Research Council and Institute of Medicine Committees, and it was evident to us at the first meeting why he was frequently nominated to be chair. He led the committee with quiet good humor, strong instinct for what's important, and respect for every member's idea. He ran a tight ship by instilling a strong ethic and commitment to the important work of the committee and by keeping members and invited speakers on task. His deep commitment to sound scientific research was evident throughout the study, and particularly through the great effort he poured into the study in the last few months of his life. He was a great mentor and a superb leader. He set a high standard for the committee's work, and we hope we completed a report that he'd be proud of.

Indy Burke, University of Wyoming  
Virginia Dale, Oak Ridge National Laboratory  
Kathy Halvorsen, Michigan Technological University  
Jason Hill, University of Minnesota  
Steve Kaffka, University of California, Davis  
Kirk Klasing, University of California, Davis  
John Miranowski, Iowa State University  
Steve McGovern, PetroTech Consultants  
Ari Patrinos, Synthetic Genomics  
Jerry Schnoor, University of Iowa  
Dave Schweikhardt, Michigan State University  
Theresa Selfa, State University of New York  
Brent Sohngen, Ohio State University  
Andy Soria, University of Alaska  
Wally Tyner, Purdue University



## CURRICULUM VITA



Lester B. Lave  
The Harry B. and James H. Higgins  
Professor of Economics & Finance  
and University Professor

Curriculum Vita

## EDUCATION

Ph.D. Economics, Harvard University, 1963  
Economics, Massachusetts Institute of Technology,  
1960-61

B.A. Economics, Reed College, 1960.

## ACADEMIC CAREER

Carnegie Mellon University

- 1993** Director of Green Design Initiative
- 1992** University Professor
- 1984** James H. Higgins Professor of Economics
- 1971** Professor, Department of Economics,  
Carnegie Mellon University
- 1979-82** Senior Fellow, Brookings Institution
- 1978-79** Visiting Scholar, Brookings Institution
- 1978** Adjunct Professor, Graduate School of Public  
Health, University of Pittsburgh
- 1971-77** Head, Department of Economics,  
Carnegie Mellon University
- 1968-70** Associate Professor of Economics,  
Carnegie Mellon University
- 1965-66** Visiting Assistant Professor,  
Department of Economics, Northwestern University
- 1967** Assistant Professor of Economics,  
Carnegie-Mellon University
- 1961-62** Teaching Assistant, Economic Statistics,  
Harvard University

## MEMBERSHIPS

American Association for the Advancement of Science  
American Economic Association  
Phi Beta Kappa  
Society for Risk Analysis

## GRANTS

Blue Moon Foundation: Alternative Fuels for Automobiles  
(Michael Griffin Co-PI)

Department of Homeland Security via USC Center (Elizabeth  
Casman Co-PI)

U.S. Department of Energy, National Energy Technology  
Laboration, "Bundling Energy Systems of the Future,"  
Marija Ilic PI

National Science Foundation, "Toward a Multi-Layered  
Architecture for Reliable and Secure Large-Scale Networks,"  
Marija Ilic PI

National Science Foundation, "Educating 21st Century  
Power Engineers," Marija Ilic PI

EPRI-Sloan Foundation funding for the Electricity Industry  
Center, Granger Morgan Co-PI

U.S. DOE: An Engineering Economic Analysis of Syngas  
Storage, Jay Apt Co-PI

NRECA: An Assessment of animal-waste-to-power  
technology and its relation to other Small-scale generation  
technologies, Granger Morgan Co-PI

National Science Foundation, Tracking Heavy Metal Life  
Cycle Pathways with Input-Output Methods, Scott Matthews  
& Chris Hendrickson, Co-PIs

National Science Foundation, Climate and Related Decision  
Making in the Face of Irreducible Uncertainties, Granger  
Morgan PI

U.S. Doe: Bundling Energy Systems of the Future, Marija Ilic PI

National Science Foundation: Toward a Multi-Layered  
Architecture for Reliable and Secure Large-Scale Network:  
The Case of an Electric Power Grid, Marija Ilic PI

National Oceanic & Atmospheric Administration (with Luis  
Cifuentes) Acid Precipitation Assessment Project 1995-96

Department of Energy (with D. Epple and S. McNeil) The  
Economic Cost of Acid Deposition to Tall buildings 1994-95

Scaife Family Foundation (with B. Fischhoff and G. Morgan)  
Perception and Communication of Greenhouse Risks,  
1992-93

Heinz Family Foundation, Improving Environmental Training in  
Mexico, 1992

National Science Foundation and Electric Power Research  
Institute (with G. Morgan and E. Rubin) Integrated Modeling  
of Greenhouse Effects, 1991-93

Brookhaven National Laboratory, SO<sub>2</sub> Allowance Trading under the 1990 Clean Air Act, 1991

National Science Foundation, (with B. Fischhoff and G. Morgan) Risk Communication 1987-90

National Science Foundation, The Safety of Dams, 1987-91

Motor Vehicle Manufacturers Association, Risk Assessment and Motor Vehicles, 1984-86

U.S. Israel Binational Science Foundation, (with M. Shechter, D. Sheter, and E. Mills), Willingness to Pay of Air Pollution Abatement in Haifa, 1985-87

National Science Foundation, Bilateral Conference with Germany on Risk Management, 1982-83

National Science Foundation, The Management of Social Risk, 1982-84

Environmental Protection Agency, Integrated Assessment of Acid Deposition Effects (with E. Rubin, et.al.) 1983-84

National Science Foundation, Regulation of the Automobile (with Robert Crandall and Theodore Keeler) 1982-83

Aspen Institute, Modeling the Effects of Carbon Dioxide, 1979-80 Nuclear Regulatory Commission, defining acceptable risk (renewal, joint with Thomas Romer), 1979-81

Sloan Foundation, Brookings Regulatory Program, (with Robert Crandall), 1980-83

American Petroleum Institute, Quantitative Risk Assessment, 1980-81

National Science Foundation, Exhaustible Resources (with Dennis Epple), 1979-81

Department of Energy, Energy Modeling, 1978-79

National Science Foundation, Pricing Government Information Services, 1978-79

Environmental Protection Agency, Air Pollution and Health, 1978-79, 1980-81

National Academy of Sciences, Energy Modeling, 1976-77

National Institutes of Health, The Value of Information Dissemination, (with S. Leinhardt and A. Raviv), 1976-78

Public Health Service, Hospital Costs, (with J. Lave), 1967-70, 1971-73, 1974-76

Richard King Mellon Charitable Trusts, Increasing the Effectiveness of Hospital Managements, (w/ J. Lave) 1970-72

Office of the Secretary of Health, Education, and Welfare, New Ideas for Hew Programs, (with R. Cyert), 1970-72

National Safety Council, Auto Safety, 1967

Resources for the Future, Assessing Air Pollution Effects, 1967-69, 1970-71, 1972-73, 1974-75

Public Health Service Grant, Cooperation in the Prisoners' Dilemma, 1963

National Academy of Sciences, Regulating Ionizing Radiation in Medicine, 1994-96

National Academy of Sciences, Voluntary Compliance with Environmental Goals and Competitiveness, 1995-96

Texaco Grant, Grant from EPA and a Grant from the Sloan Foundation to examine the life cycles of alternative automobile fuels and power technologies, 1997

PI on grants from the National Science Foundation and Department of Energy, 1997

Member, EPA Advisory Council on Clean Air Act Compliance Analysis

NSF: A technological-economic-organizational analysis of ethanol as an automobile fuel, \$311K w/ Linda Argote, Michael Griffin

NSF: Environmental management systems: informing organizational decisions, \$323K w/ Chris Hendrickson

NSF: A mass balance framework for assessing flows of environmental pollutants: Application to the lead case, \$429K with Cliff Davidson, Fran McMichael

Heinz Endowments: Assess whether laboratory derived toxicological data adequately predicts the effects of human exposure, \$50K

Heinz Family Foundation: Comparing the Environmental Performance of Mexican & American Factories

EPA: Cooperative agreement on energy modeling

NSF: Implications of Decentralized Electricity Generation with Sarosh Talukdar & Granger Morgan

Sloan Foundation & Electric Power Research Institute: Grant to establish Electricity Industry Center

William Recker: Support for Green Design

Tennessee Valley Authority: Estimating the value of ancillary power in TVA

National Rural Electrical Cooperatives: Animal Waste to Power, with Granger Morgan

## PROFESSIONAL AND EDITORIAL ACTIVITIES

Elected to Institute of Medicine, (National Academy of Sciences), 1982

G.L. Bach Award for Teaching Excellence, 1987

Consultant, EPA Science Advisory Board, 1986

President 1985-86, 1986-87; Council Member 1982-85, Society for Risk Analysis

National Research Council, Dietary Guidelines Implementation Committee; 1988

Advisory Board, Issues in Science and Technology, 1987

Water Sciences and Technology Board, National Research Council, 1985-88

Board on Health Promotion and Disease Prevention, National Academy of Sciences, 1983

Climate Committee, American Association for the Advancement of Science, 1983-87

National Academy of Sciences, Assembly of Behavioral and Social Sciences Executive Committee, 1971-77; Acting Chairman, 1975-76

Advisory Committee, Regional Medical Program of Western Pennsylvania, 1972-75

Board of Directors, GASP, 1970-84

Health Task Force for the Governor of Pennsylvania, 1968-70

Editorial board of the Journal of Risk and Uncertainty and the International Journal of Life Cycle Analysis

National Academy of Sciences Committee: "America's Energy Future" and was appointed chair of the NAS panel on "Energy Efficiency/Conservation"

National Academy of Sciences, Committee on the Benefits and Costs of Automobile Emissions

National Academy of Sciences, Committee on Social Research and Development

Consultant, National Academy of Sciences, Committee on Natural Resources and the Environment, Panel on Coal Worker's Pneumoconiosis

National Academy of Sciences, Chairman of Synthesis Panel, Committee on Nuclear and Alternative Energy Systems

National Academy of Sciences, Helium Committee

National Academy of Sciences Committee on Dam Safety

National Academy of Sciences: Energy Engineering Board

National Bureau of Standards: Hydrogen Study Committee

American Medical Association Panel on the Risks of Nuclear Power and Low Level Radiation

Consultant, Nuclear Regulatory Commission Advisory Committee on Reactor Safety

National Academy of Sciences, EPA Research and Development Planning

Advisory Committee, AAAS Study on Intergovernmental R&D

Advisory Committee, Princeton University Cancer Project

National Academy of Sciences, Committee on Energy Conservation

Advisory Committee, AAAS Carbon Dioxide Study

Advisory Committee, SIPI Natural Gas Study

Advisory Committee, Aspen Institute on Formulating A Social Sciences Agenda for CO<sub>2</sub> Research

Associate Editor, Annual Review of Public Health

Associate Editor, Journal of Environmental Economics and Management

Associate Editor, Journal of Urban Economics 1980-89

Book Review Editor, Issues in Science and Technology 1985-89

Associate Editor, Energy Systems and Policy

Associate Editor, Journal of Regional Science 1980-89

Associate Editor, Journal of Risk Analysis

Editorial Committee, American Scientist 1982-89

Associate Editor, Journal of Risk and Uncertainty

Publications Committee of Issues in Sciences and Technology

Advisory Committee of the University of Virginia's Center for Risk Analysis

American Medical Association Committee on the Risks and Benefits of Nuclear Power

Elected to Nominations Committee, Section and Behavioral and Social Sciences, AAAS, 1988-89

Chair, Chair of Nominations Committee, AAAS section on Behavioral and Social Sciences, 1991-92

National Academy of Sciences, Committee on the Research Agenda for Highway Safety, 1989-90.

Chair, Advisory Committee of Study on Police Armor, Office of Technology Assessment, 1991-92

Advisory Committee on the Role of the National Library of Medicine Concerning Toxicological and Environmental Information, National Library of Medicine, 1991-92

National Research Council, Committee on the Decade of Natural Disasters, 1991

National Research Council, Board on Natural Disasters, 1992

Taught in MBA program, U.S. Business School in Prague 1991 & 1993

"Program Committee," SAE Total Life Cycle Conference, Detroit, April 2000

"Estimating the Risks from Flooding," National Research Council Committee

"Advisory Council on Clean Air Compliance Analysis," Environmental Protection Agency

"Advisory Committee of the Global Change Center," CMU

"Advisory Committee of the Center for the Study and Improvement of Regulation," CMU

"Advisory Committee," Office of Risk Analysis and Cost-Benefit Analysis," U.S. Department of Agriculture

Steering group of Consumer Energy Council of America study of electricity deregulation

American Chemistry Council: Advisory Committee on Chemical Exposures

National Academy of Sciences: Committee on EPA Human Subjects

CMU CSIR Steering Committee

CMU Global Change Center Steering Committee

Director Green Design

Co-director: Electricity Industry Center

Governing Board and Research Advisory Committee, Carnegie Bosch Institute

Berkman Grant evaluation committee

Joined new NAS Committee on an evaluation of the Army Corps of Engineer's study of navigation on the Upper Mississippi River

NAS Committee on intentional Human exposure to toxicants finished its report

Continued as a member of EPA Council on Clean Air Compliance

NSF panel evaluating grants concerning electricity research

Vice Chair, Planning Committee, Notre Dame-CMU conference on Engineering Ethics and the Electricity Industry

Served on the editorial boards of the International Journal of Life Cycle Analysis, the Journal of Risk and Uncertainty, and Risk Analysis

Organized a session at the ASSA annual meeting

With Marija Ilic he organized a conference at CMU on Transmission issues for the electricity industry. There were 70 attendees from Europe, Korea, Japan, and the USA

With Mike Ashworth and Clark Gellings he organized a conference at CMU on the Aging Workforce in the Electricity Industry. There were 30 attendees from around the USA.

## CONSULTING EXPERIENCE

**1991** Northeast Utilities  
**1990** Buckeye Oil Products Pipeline  
**1983-84** National Science Foundation  
**1982-83** Office of Technology Assessment  
**1981-82** U.S. Army  
**1979-83** Department of Energy  
**1981** Environmental Protection Agency  
**1981-82** Federal Trade Commission  
**1980** American Petroleum Institute  
**1978-80** Jack Faucett Associates  
**1979-80** Council on Wage and Price Stability  
**1979-80** Environmental Protection Agency  
**1978-79** Department of Justice  
**1978-79** Science Applications Associates  
**1978-80** U.S. General Accounting Office  
**1977-78** National Bureau of Standards  
**1975-80** Department of Health, Education, and Welfare  
**1974-76** Electric Power Research Institute  
**1974-76** Mathematica  
**1974-78** Consad  
**1972-74** General Motors Research Labs  
**1976-87** General Motors Research Labs  
**1970-73** Charles River Associates, Cambridge, Massachusetts  
**1970-72** The Urban Institute  
**1970-71** HEW, National Air Pollution Control Administration  
**1968-68** Department of Transportation

**1966-69** Research Management Corporation, Bethesda, MD  
**1966-67** Department of Defense  
**1965-69** Army Waterways Project, Econometric Research Center, Northwestern University  
**1965** President's Appalachian Study Commission  
**1961-62** Systems Analysis and Research Corporation  
**1960-76** The RAND Corporation

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Last updated by Lester, April 2010.



## What I remember most about Lester...

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was his kindness and willingness to always make time in his busy schedule for family and friends. When my son, Joshua was 2 years old, he did not speak, we later learned that there was a hearing problem, which was easily remedied. On a visit with Joshua, Lester would share his precious time with Joshua, using letter blocks to spell out words. Giving him math problems to work on. We were all amazed that 2 year old Joshua was able to do these things, and that Lester was able to communicate and teach at the same time. The patience and love that he shared with my son, was one example of the beautiful man that Lester was. You cannot choose your family, but you can certainly distance yourself from them. Lester never did that, he was always there with good advice and love for his little sister and her family. Lester represented the best of humanity, and I will always be grateful that he was a part of my life.

Carol Lave Kaufman



**Carnegie Mellon University**