



Professor Sia Nemat-Nasser

See:

<http://orlabs.oclc.org/identities/lccn-n80-150267/>

<https://sites.google.com/a/eng.ucsd.edu/nemat-nasser/>

<http://www.mtse.unt.edu/Needleman/Publications.html>

<http://imechanica.org/node/4233>

<http://imechanica.org/node/3832>

<http://imechanica.org/node/3314>

<http://imechanica.org/user/2962>

<http://imechanica.org/taxonomy/term/2432>

http://pt.wikipedia.org/wiki/Sia_Nemat-Nasser

<http://www.sem.org/HON-Nemat-Nasser.asp>

<http://spie.org/app/profiles/viewer.aspx?profile=DUGIEY>

<http://65.54.113.26/Author/12873774/sia-nemat-nasser>

Director of the Center of Excellence for Advanced Materials (CEAM)

Distinguished Professor of Mechanics and Materials

Department of Mechanical and Aerospace Engineering

University of California, San Diego

EDUCATION

Doctor of Philosophy, 1964, University of California, Berkeley, Berkeley, CA.

Master of Science, 1961. University of California, Berkeley, Berkeley, CA.

CURRENT RESEARCH INTEREST

Experimentally-based analytical/computational, nano-scale modeling of response and failure modes of materials, particularly multifunctional structural systems, e.g., structural composites with tunable electromagnetic functionality, thermal management, self-healing, self-sensing and metamaterials with negative refractive index; polyelectrolytes and ionic polymer metal composites as soft-actuators and sensors; shape-memory alloys; bio-hybrid interfaces and their short- and long-term functionality; advanced metals and ceramics; elastomers; granular materials; and hybrid composites.

CURRENT RESEARCH TOPICS

Multiscale Multifunctional Materials: self-healing, self-sensing, and electronically tuned composites

Adaptive Materials for Energy-Absorbing Hybrid Structures

Dynamic Response of Elastomers (particularly polyurea and polyurethane)

Dynamic and Quasi-Static Response of Shape-Memory Alloys and Structures

Self-assembling Single-walled Carbon Nanotubes

Structural Composites with Tuned EM Chirality

Microstructural Design for Stress Wave Energy Management

Elastomeric Polymer-by-Design for Blast-Induced Shock-Wave Management

Materials with Controlled Microstructural Architecture

ACADEMIC CAREER

2004-Distinguished Professor of Mechanics and Materials, Dept. of MAE, UC San Diego

1999-Professor, Mechanical and Aerospace Engineering, UC San Diego

1998-00-Director, Institute for Mechanics and Materials, UC San Diego

1992-97-Co-Director, Institute for Mechanics and Materials, UC San Diego

1989-94-Founding Director, Materials Science and Engineering Program, UC San Diego

1986-Director, Center of Excellence for Advanced Materials, UC San Diego

1985-99-Professor, Applied Mechanics and Engineering Sciences, UC San Diego

1972-73-Visiting Professor, The Technical University of Denmark, Lyngby, Dept of Solid Mech.

1970-85-Professor of Civil Eng. and Applied Math., Northwestern Univ., Evanston, IL

1969-70-Associate Professor of Applied Mechanics, UC San Diego

1966-69-Assistant Professor of Applied Mechanics, UC San Diego

1965-66-Senior Research Engineer, Northwestern University, Evanston, IL

1964-65-Postdoctoral Fellow, Northwestern University, Evanston, IL

1963-64-Teaching Fellow (part-time), UC Berkeley

1961-62-Assistant Professor of Civil Engineering, California State College (now University), Sacramento

AWARDS, FELLOWSHIPS AND RECOGNITION

- 2011 Inaugural Felix Bloch Lecturer, Phononics 2011 Conference
- 2011 4th Elsevier Distinguished Lecturer in Mechanics, New Jersey Institute of Technology
- 2011 1st Recipient of the SEM Sia Nemat-Nasser Medal [formally the Sia Nemat-Nasser Award]
- 2010 Yunchuan Aisinjiro-Soo Distinguished Lectureship, U. of Illinois at Urbana-Champaign
- 2010 Russell Severance Springer Professor - Fall Semester 2010, UC Berkeley
- 2009 SEM establishes the 'Sia Nemat-Nasser Award' to recognize an individual for distinguished, innovative and outstanding work that has realized the impact of experimental mechanics on other scientific and engineering fields through an integrated multidisciplinary research.
- 2009 M.W. Murray Medal and Lecture, Society of Experimental Mechanics
- 2008 Stephan P. Timoshenko Medal, American Society of Mechanical Engineers
- 2008 Theodore von Karman Medal, American Society of Civil Engineers
- 2008 ASME Materials Division establishes 'The Sia Nemat-Nasser Early Career Medal,' to recognize the excellence of young investigators who are within ten years after their Ph.D
- 2008 Distinguished Service Award, California State University, Sacramento, & Sacramento State Alumni Association
- 2007 American Society of Mechanical Engineers IMECE Symposium on Modeling and Experiments in Nanomechanics and Nanomaterials - In Honor of Sia Nemat-Nasser, Seattle, WA, Nov. 2007
- 2007 B.J. Lazan Award, Society of Experimental Mechanics
- 2006 Robert Henry Thurston Lecture Award, American Society of Mechanical Engineers
- 2006 Certificate of Recognition-Outstanding Dedication as Faculty Mentor, UC Faculty Mentor Program
- 2005 Honorary Member, American Society of Mechanical Engineers
- 2005 Faculty Research Lecturer Award, UC San Diego
- 2004 Honorary Member, World Innovation Foundation
- 2003 Willard F. Rockwell Medal, International Technology Institute
- 2003 Honorary Member World Level of the Hall of Fame for Engineering, Science and Technology, HOFEST
- 2003 Best Paper of the Year Award, Adaptive Structures and Materials Systems, [Nemat-Nasser, S. "Micromechanics of Actuation of Ionic Polymer-metal Composites," Journal of Applied Physics, Vol. 92, No. 5 (2002) 2899-2915], American Society of Mechanical Engineers Aerospace Division
- 2002 Nadai Medal, American Society of Mechanical Engineers
- 2002 William Prager Medal in Solid Mechanics, Society of Engineering Science
- 2001 Life Fellow, American Society of Mechanical Engineers
- 2001 National Academy of Engineering, Member
- 2001 MMC2001 Conference Symposium on Experiments and Modeling of Failure of Modern Materials-In Honor of Sia Nemat-Nasser's 65th Anniversary, San Diego, CA
- 2000 Millsaps-Taylor Memorial Lecture, University of Florida
- 2000 Teacher of the Year Award, Jacobs School of Engineering, UC San Diego
- 2000 Certificate of Recognition - Outstanding Support as Faculty Mentor to McNair Scholar, UC San Diego
- 1997 Technical University of Crete's Gold Medal
- 1997-98 - Chair, American Society of Mechanical Engineers, Materials Division
- 1996-97 - Outstanding Teaching Award, School of Engr. Mechanical Engineering, UC San Diego
- 1996-97 - President, American Academy of Mechanics
- 1996 Int'l Symposium on Deformation Characteristics and Modeling of Materials - In Honor of Sia Nemat-Nasser's 60th Anniversary, Sendai, Japan; [Mech. of Mater. Vol. 28 (1-4) 1998].

1995-00 - John Dove Isaacs Chair in Natural Philosophy
1994-95 - Teacher of the Year Award, School of Engineering-AMES Dept, UC, San Diego
1988-94 - Secretary, American Academy of Mechanics
1988 Fellow, Society of Engineering Science
1987 Foreign Fellow, Danish Center for Applied Mathematics and Mechanics
1979 Fellow, American Society of Mechanical Engineers
1979-80 - President, Society of Engineering Science
1976-82 - Director, Society of Engineering Science
1975 Alburz Educational Foundation Prize
1972-73 - Fellowship, Technical University of Denmark, Lyngby
1970 Founding Fellow, American Academy of Mechanics
1963-64 - Ford Foundation, UC Berkeley
1962-63 - Arthur Gould Tasheira Fellowship, UC Berkeley
1959-60 - Student Award Certificate, American Society for Testing and Materials

SOCIETY MEMBERSHIPS (Current):

American Academy of Mechanics

- Member, Honors (Awards) Committee (2005-)
- President (1996-97)
- President-Elect (1995-96)
- Secretary (1989-1994)
- Founding Fellow (1970 - present) - Timoshenko Medal Committee, Member (2009-2014)

American Association of University Professors (since 1983)

American Society of Civil Engineers

- Charter Member of Engineering Mechanics Institute (2009)
- Lifetime Membership Certification 2003
- Engineering Mechanics Division:
 - Committee on Inelastic Behavior (1983-85) (1992-95)
 - Member (1975)

American Society of Mechanical Engineers

- Honorary Member (2005)
- Lifetime Membership Certification for 35 years of support (2001-)
- Fellow (1979)
- Applied Mechanics Division:
 - Timoshenko Medal Committee, Member (2009-2014)
 - Committee on Geomechanics, Member (1992-1995)
 - Committee on Geomechanics, Chairman (1981-85)
 - Program Committee, Member (1979-82)
- Materials Division:
 - Executive Committee, Member (1993-98)
 - Chair (1997-98)
- Materials & Structures Technical Group:
 - International Congress Group Representative (1995)

International Society for Computational Engineering & Sciences (ISCES)

- Founding Member (1999-)

International Technology Institute (2003-)

National Academy of Engineering

- Member, 2001

- Co-Chair Section 10 Search Committee (2007-2010)

- Member, 2009 Nominating Committee

Society of Engineering Science

- Silver Member Certification for 24 years of support (2009 -)

- Fellow (1988 - present)

- Committee on Geophysical and Geotechnical Phenomena, Chairman (1984)

- President (1979-80)

Society of Photo-Optical Instrumentation Engineers (SPIE) (1999-)

The American Society for Metals (ASM) International (1987-)

The Mathematical Association of America (2004 -)

The Minerals, Metals and Materials Society (TMS) (1996-)

The Society for Experimental Mechanics (1984-)

- Fellow (2011 - present)

World Innovation Foundation (2004-)

SERVICE TO SCHOLARLY BOOKS AND JOURNALS

Editor of Mechanics Today, series of books (Vols. 1-6 published by Pergamon Press on behalf of the American Academy of Mechanics) (1974-1976, 1978, 1980-1981)

Co-Editor of Mechanics of Elastic and Inelastic Solids, series of seven books, published by two publishers; Martinus Nijhoff and Kluwer Academic (1980 - 1989)

Editor, Three Dimensional Constitutive Relations and Ductile Fracture, North Holland Publishing (1981)

Editor-in-Chief, international journal Mechanics of Materials (1982 - present)

Editor, Mech. Mater. "Inelastic Deformation and Failure Modes," Vol. 4 (1985)

Honorary Editorial Advisory Board Member, Iranian Journal of Science and Technology (until 1979)

Advisory Board Member, international journal Mechanics-Research Communications (until 1985)

Editorial Board Member, international Journal of Soil Dynamics and Earthquake Engineering (1980-1990)

Editorial Advisory Board Member, Microcomputers in Civil Engineering

Editorial Advisory Board Member, international journal Japan Society of Mechanical Engineers (1990-1994)

Editorial Board Member, international journal Mechanics and Materials in Design (2001-)

Editorial Board Member, journal Mechanics of Advanced Materials and Structures (2004-)

PUBLICATIONS AND LECTURES:

Has authored, co-authored, or edited over twenty books and proceedings, and has organized over forty scientific workshops and meetings, including organization of the 2001 Mechanics and Materials Summer Conference, jointly sponsored by ASME's Materials and Applied Mechanics Divisions, ASCE Engineering Mechanics

Division and the Society of Engineering Science. He has published over 470 scientific articles and has presented over 430 lectures and seminars at scientific meetings and at various institutions, with more than thirty-five being plenary or keynote lectures.

2008 ASME Timoshenko Medal Acceptance Speech by Sia Nemat-Nasser

A Mechanics-Guided Journey through Engineering Science

Before I start, let me mention my wife, Eva's contribution to this lecture. She said to me to make a draft first and then she would be happy to help me to tighten it up later on. After a day and half's work, I took the result to her who quickly informed me that: it was much too long, contained too much unnecessary details, and that, it can be reduced by 3/4th without losing anything significant!

After another several hours of effort, I took the product to her who immediately requested further reduction, by at least a factor of two!

This process went on for a few cycles when, finally, she said: "if you cut it in half, then it might be OK."

I did.

She looked at it and asked me to read it out loud.

I read: "Ladies and gentlemen, and the Timoshenko Medal Committee, thank you very much."

"Now, that is a good after dinner speech", she shouted.

Then she thought for a minute and said: "You Persians are very wordy. If you leave out the 'very much', and just say 'thank you' then it would be a great after dinner speech!"

I wish to first thank our gracious MC, Professor Dan Inman, for his generous introduction. I would also like to thank you, ladies and gentlemen, for being here tonight, after several arduous political weeks of having repeatedly heard from Joe the Established Politician, Joe the Unlicensed Plumber, and Jack the Unknown Electrician, just to mention a few, to hear from Sia, the also Unlicensed Mechanician.

I am indeed, thrilled and honored to have been chosen as the 2008 Timoshenko Medalist, and wish to thank the Timoshenko Medal Committee for, at least from my point of view, a pretty good choice!

I have admired Timoshenko and the impact of his remarkable teaching through his books, since I was an undergraduate student and, later, as a graduate student, having managed to purchase and study essentially all of them, which I still possess and often use.

As for tonight, I am amazed that you, ladies and gentlemen, have chosen to be here, listening to me, rather than being glued to the television, hopping from the Situation Room of Wolf Blitzer, to Mark Shields, David Brooks, and Jim Lehrer's more philosophical pontification, or, I hope quite unlikely, Fox News' Sean Hannity and his profoundly intellectual colleagues.

As for the presidential candidates, while I have rooted for Obama, and I have been proudly wearing an Obama-Biden button, I also purchased, just before coming to Boston, a McCain banner, in case all the polls turn out to be incorrect.

In either case, truly, one should wonder why two exceptionally talented individuals would want to compete so hard for so long and with such passion, for the opportunity to inherit:

Two unwinnable wars,

A crumbled economy, and

The leadership of a turbulent, hostile, and unstable world politics and economy, instead of sipping wine and contemplating about life. And, more interestingly, it is mind-boggling why we, a bunch of intelligent people, so enthusiastically cheer them on in their misguided journey, and even put down our hard-earned money to help them succeed in their ill-chosen quest.

Putting aside the mundane issues of war and peace, potential economic bankruptcy, and the collapse of the world politics, let me now focus on the main purpose that has given me the privilege of addressing you, ladies and gentlemen.

Being honored by this prestigious medal, late in one's professional life, has its advantages and disadvantages. One advantage is a long professional experience with a rich supply of anecdotes to share.

The disadvantage, however is that one would know that one should not overdo it, as we have been reminded by many of the previous recipients of John Hutchinson's famous advice to his distinguished colleague, Bernie Budiansky, after having introduced him, saying, "Bernie, keep it short."

What many of you may not have heard is my own unique experience with John: when I first heard that John would be receiving the Timoshenko Medal, I wrote a congratulatory email to him, and, in passing, reminded him of his advice to Bernie, in San Francisco, in a Chinese Restaurant, to keep it short. John immediately wrote back, thanking me, and, at the same time informing me that he does not practice what he expects others to do.

Tonight, however, I should try very hard to do what John does not do, yet expects me to do.

2008 has been a significant year for me. It marks 50 years since I stepped on American soil, on June 23, 1958, as an undergraduate student, with \$200 worth of American Express checks in my pocket and a great deal of hope in my heart. Remarkably, the Timoshenko Medal which was established in 1957, with Timoshenko being the first recipient, was given to three giants of our field, Arpad Nadai, Geoffrey Taylor, and Theodore von Karman, in 1958.

The journey to the US was preceded by many events that, in retrospect, make me realize how lucky I have been to have survived through them all. And this, I mean, literally. My high school years, as well as my 2 years at Teheran University, were filled with political turmoil with unpredictable consequences, as I had been present within crowds when, once the dust had settled, at least a few bodies journeyed to the morgue.

In the halls of the engineering school at Teheran University, for example, the marble columns featured repaired bullet holes, witnessing an event that just a few years earlier took the lives of 2 engineering students. Even, under those conditions, I continued to be lucky, enjoying the respect and undeserved attention of colleagues and professors, as the top student of the school of engineering.

Nevertheless, I had decided to try my luck in the United States, even though I lacked the financial means. The story that took me to Sacramento and hence, Sacramento State (then) College, and later, to Berkeley, also involved numerous unexpected events which only my good luck had produced favorable results, although my academic record also helped. In addition to well-paying part-time work in civil engineering firms in Sacramento, which I frequented every summer and during holiday vacations, there was ample financial support in the form of forgivable loans, fellowships and rather light teaching assistantships.

The intellectual life at Berkeley was, indeed, rich and exciting. I had the good fortune to know some of the most distinguished mechanics of the time, and participate in the excitement of the new wave of more fundamentally-based structural mechanics and structural engineering.

Unquestionably, this trend emerged because of Timoshenko's influence. While I did purchase and study all the black-covered books of Timoshenko, I did also carefully study his red-covered advanced strength of materials book which I still possess and occasionally consult.

The next stroke of good luck was when I met George Herrmann who came to Berkeley to present a seminar. My advisor, Colin Brown, in passing, suggested that I should talk with Professor Herrmann who was then looking for a post-doc.

A trip to the library taught me that Northwestern University was located in Evanston, Illinois, with the largest number of churches per capita in the United States at the time and associated with Berkeley activists, I shaved my beard before the interview, being rather amazed that George had noticed it before, and asked me why I had shaved off my beard and that it actually looked good on me. I simply said, "If you give me the position, I will grow it back". He did and I did.

The departure from Berkeley in the summer of 1964 occurred in the wake of Mario Savio's four-letter-word free-speech movement, which arguably marked a new chapter in the culture of the United States.

The intellectual life at Northwestern was vibrant and remarkably enriching. It was there that I not only had the good fortune of meeting Eva, and with her creating a new chapter in our family life, but also, I met and made life-long friends with some of the most intelligent and creative applied mechanics of our generation, several of whom have already been honored by the Timoshenko and other ASME medals.

The impact of Sputnik had been driving graduate education and research in engineering and creating a tumultuous environment for new positions at various universities, with essentially guaranteed research funding. I was recruited by Bill Prager to join the newly established Department of Aerospace and Mechanical Engineering Sciences (AMES) at UCSD, while, at the same time being courted by several other universities.

The final decision was easy to make, once I visited La Jolla, during a cold spell in Chicago, walked by the ocean, and realized the position will give me an opportunity to be a colleague of luminaries, such as Bert Fung,

John Miles, Sol Penner, and many others in the department, as well as more than half-a-dozen Nobel Laureates, on a university faculty of 275.

Even so, Governor Reagan's rather less than friendly attitude toward the University of California, the Regents' hostility toward Herbert Marcuse, Angela Davis, and the Nobel Laureate, Linus Pauling, produced a situation that drove Bill Prager back to Brown, and me back to Northwestern, where I had the opportunity to work with my contemporary young colleagues and friends, while the growth at UCSD had been basically stopped.

It was during my 15 years at Northwestern that, I feel, my scientific growth took place, in major part because of close association and collaboration with colleagues, such as John Dundurs, Toshio Mura, Jan Achenbach, Leon Keer, Zdenek Bazant, and, later on, Ted Belytschko, not to mention more established luminaries, such as Hans and Julia Weertman, as well as Morrie Fine.

There, I had the opportunity to move into new areas, such as soil mechanics in relation to earthquake-induced liquefaction, rock failure and fracturing in relation to hot dry-rock geothermal energy, and the mechanics of frictional granules, just because it was fascinating. Timoshenko's teaching that embodied the application of rigorous mechanics principles, the necessary applied mathematics, and a great deal of intuitive physical insight, was indeed the key to most of my contributions.

I also enjoyed having some very outstanding coworkers and graduate students such as Monte Mehrabadi, Minoru Taya, Tetsuo Iwakuma, Hideyuki Horii, Makoto Obata, and Muneo Hori, as well as a number of outstanding Japanese visitors and post-docs, thanks to Toshio Mura who provided the bridge between Northwestern and the Japanese mechanics community.

My work on liquefaction that aimed at understanding the basic phenomenon through mechanics-based mathematical modeling, supported by my own and others' laboratory experiments, has since been used extensively, not only to understand laboratory results, but also actually, to assess site potentials for liquefaction in actual field applications. Yet, at the time, it took quite a bit of doing to get the paper published in a geotechnical journal. I am pleased to see that we have come a long way, not least thanks to Timoshenko and his influence.

One fact, I learned early on, was the necessity of simple experiments to support mathematical modeling. I followed this all through out my tenure at Northwestern University, beginning with some cute yet intriguing experiments on flutter, with George Herrmann, and then model experiments to show compression-induced axial splitting, faulting, and transition from brittle to ductile failure of brittle materials such as rock and concrete.

In this case, my graduate student, Horii, and I did a number of convincing experiments on models made out of a brittle polymer, using a large vise in our group's top technician, John Schmidt's lab. Remarkably, the idea to do such model experiments came when my young colleague, John Rudnicki, commented on my work with Horii, on tensile crack growth under compression, a completely mathematical exercise, using Muskhelishvili's complex potentials and some elaborate calculations. John simply said: "It's interesting, but you will have a hard time to convince geophysicists and rock mechanics."

The analysis that followed and a sequence of model experiments, some quantitative, resulted in 3 papers that have since served as a basis for understanding brittle fracturing under compression.

As I look around the country and even worldwide at our community, I see many applied mechanics of my generation have successfully moved into new fields, be it earthquake prediction, macro-molecules, biomechanics, or genetics, and guided by the culture that is rooted in Timoshenko's teaching, managed to open new horizons in engineering science.

In my own case, when I returned to UCSD in 1985, the then fertile environment allowed the creation of an integrated campus-wide materials science program that brought colleagues from physics, chemistry, oceanography, and engineering under a unified umbrella.

This has been truly enriching for me and my students, as well as my materials science, chemistry, physics, and biology colleagues and their students. In the process, I was fortunate to learn and use a lot of physics, chemistry, and create and use new experimental techniques.

The work on ionic polymer-metal composites which are electro-active soft actuators and sensors, would have been impossible without collaboration with my chemistry colleague, Yitzhak Tor. Similarly, my work on modeling, design, fabrication, and characterization of healable composites with negative refractive index, could not have been possible without collaboration with my son, Syrus, who was a PhD graduate of UCSD's physics department, and with his coworkers, David Smith and others, as well as with Yitzhak.

While it was in some measure Governor Ronald Reagan's attitude toward the University of California that helped to drive me back to Northwestern in 1970, it was also his support as the President, of university research through his URI (University Research Initiative) program that allowed me to create a large experimental laboratory at UCSD, as well as to attract ten new faculty colleagues in Mechanics and Materials within the span of only three years.

Within the same span of time, a major center with the state-of-the-art and some novel facilities was created at UCSD, under the sponsorship of ARO, called the Center of Excellence for Advanced Materials (CEAM), a rather challenging name to live up to!

Here again I was very lucky in not only securing ample research funds, but also in having excellent colleagues and coworkers, such as John Starrett, who unfortunately passed away at the young age of 47 in 1990, and Jon Isaacs, who has been with me since 1987. In our laboratory we can quantify the thermo-mechanical and electromagnetic properties of a broad class of materials, as well as fabricate multifunctional self-healing and self-sensing composites.

Let me finish with two comments.

To my young colleagues and students, I say follow your passions, as I have been fortunate to follow mine and actually get paid for it.

To the Timoshenko Medal Committee I give my greatest thanks for honoring me in Boston which, in the mid 1800s, was the intellectual hotbed of antislavery and pro women's rights. It was in 1823 when Thomas Wentworth Higginson was born in the neighboring town, Cambridge, graduated from Harvard at the age of 18, and led an intellectual yet action-oriented fight for black-Americans and women's equality. In 1904 Higginson anticipated that eventually

"marriage may come to be founded, not on the color of the skin, but on the common courtesies of life, and upon genuine sympathies of heart and mind."

Although, he may have been 100 years ahead of his time, I have no doubt that he would have been proud to see two women striving for the highest offices in the land, and the son of a black African father and a white American mother graduating from Harvard and potentially attaining the presidency.

Thank you very much for listening to me and let us go to see if he has done it!