

## **BRIEF CURRICULUM VITAE**

**Lester Ingber, Ph.D.**

### **Full CV**

[https://www.ingber.com/ingber\\_CV.pdf](https://www.ingber.com/ingber_CV.pdf) (or [ingber\\_CV.txt](https://www.ingber.com/ingber_CV.txt))

### **Summary of Projects**

[https://www.ingber.com/ingber\\_projects\\_brief.pdf](https://www.ingber.com/ingber_projects_brief.pdf)

### **Publications**

<https://www.ingber.com/ingber.bib.html>

### **SCIENTIFIC PURSUITS**

Prof. Lester Ingber has published over 100 papers and books in the categories of: theoretical physics, neuroscience, finance, optimization, combat analysis, karate, and education. As CEO of Physical Studies Institute LLC (PSI) he develops and consults on projects documented in the archive

<https://www.ingber.com/>

### **Nuclear Physics**

From 1965-1972 he published in atomic, nuclear, astro-, and elementary particle physics. His major work was to develop a nucleon-nucleon interaction described by exchanged mesons, and to apply this interaction to calculate properties of nucleon-nucleon scattering, the deuteron, nuclear matter, and neutron stars. In 1983-1986 he used modern methods of nonlinear functional analysis developed in the late 1970's to discover contributions induced by velocity-dependent potentials to nuclear matter binding energies.

### **Neuroscience**

Since 1978 he has developed a statistical mechanics of neocortical interactions applicable to a broad range of spatial and temporal scales, using modern methods of nonlinear nonequilibrium statistical mechanics of neocortical interactions (SMNI) to calculate brain 'observables', e.g., short-term memory and EEG analyses. His 1983 *Physical Review paper* was the first paper accepted on the brain in this premier physics journal. From Feb 2013 through Dec 2021, he used XSEDE.org resources, extending the range of SMNI from EEG to molecular processes, and developing quantum algorithms that have broad applications ranging from computational neuroscience to computational physics to blockchains. From 2021 he is using the StonyBrook.edu Ookami supercomputer for similar projects. A current project at the Ookami supercomputer at StonyBrook.edu uses Classical Computers with qPATHINT codes to develop classical SMNI interacting with quantum tripartite neuron-astrocyte-neuron synaptic interactions.

### **Finance**

Since 1980 he has developed a statistical mechanics approach to financial markets, e.g., to multivariable term structure and stochastic markets. His 1990 *Physical Review paper* was the first paper accepted on finance in this premier physics journal. From 1997-2001, as Director R&D at DRW Trading in Chicago, he led a team developing multi-factor nonlinear stochastic models of markets. From 2002-2003 he was

Director R&D at DUNN Capital Management in Stuart FL, developing risk-management algorithms. From 2011-2013 he was a Partner in Pion Capital, a hedge-fund partnership of Caltech alumni. Previous projects have used qPATHINT and qPATHTREE to develop quantum options on quantum money.

### **Optimization/Modeling**

Since 1987 he has developed Adaptive Simulated Annealing (ASA), one of the most powerful optimization algorithms for nonlinear and stochastic systems, working with thousands of users. Other codes have been developed to model multivariate nonlinear stochastic systems. In 1994-1995, as principal investigator (PI) of an NSF Supercomputer grant, he ported his ASA and PATHINT codes onto parallel supercomputers.

### **Combat Simulation**

From 1986-1989, as PI of an Army contract, he applied these methods of mathematical physics, leading a team of scientists and officers to develop mathematical comparisons of Janus computer combat simulations with exercise data from the National Training Center (NTC), developing a testable theory of combat successfully baselined to empirical data.

## **EDUCATION AND POSITIONS**

### **Education**

He received: his diploma from Brooklyn Technical High School in 1958; his B.S. in physics from Caltech in 1962; his Ph.D. in theoretical nuclear physics from UC San Diego in 1967, having studied at the Niels Bohr Institute in 1964, and having consulted at RAND in 1965-1966.

### **Positions**

He was a National Science Foundation Postdoctoral Fellow at UC Berkeley in 1967-1968 and at UC Los Angeles in 1968-1969, an Assistant Professor in physics at SUNY at Stony Brook (SUNY SB) from 1969-1970, and a research physicist in the Physics department and in the Institute for Pure and Applied Physical Sciences (IPAPS) at UC San Diego from 1970-1972. From 1970-1986 he was President of Physical Studies Institute Inc. (PSI), a nonprofit corporation he founded in 1970, which was an agency account in IPAPS from 1980-1986. From 1970-1972 he developed teaching methodologies for academics and fine arts, instructing in and administrating a six-course program through UC San Diego Extension. From 1972-1978, though PSI, he founded, funded, and instructed in an experimental alternative high school offering 30+ courses in academics, fine arts, and physical disciplines.

He was a Research Associate at UC San Diego in the Music department from 1972-1974 and in IPAPS from 1980-1986. He was awarded a Senior Research Associateship for 1985-1986 by the National Research Council (NRC) of the National Academy of Sciences, taken at the Naval Postgraduate School (NPS) in Monterey, CA. From 1986-1989 he was Professor of Physics at NPS at a GS-15 Step 10 equivalent position. In March 1988 he was officially offered a Senior Executive Service (SES) appointment as Assistant Director of the Joint Tactical C<sup>3</sup> Agency (JTC3A); he declined to complete his projects. From February through June 1989 he was on extended temporary duty at US Army Concepts Analysis Agency (CAA) in Bethesda, MD. In 1989 He won a second NRC Senior Research Associateship, taken at the Naval Ocean Systems Center (NOSC) in San Diego. From 1989-1990 he was Research Professor of Mathematics at The George Washington University (GWU), D.C.

From 1989-1997, through Physical Studies Institute LLC (PSI), he consulted on projects in his fields of expertise. From 1997-2001 he was Director of Research and Development at DRW Trading, a trading firm in Chicago, IL. From 2002-2003 he was Director R&D at DUNN Capital Management in Stuart FL. In 2012 he was Editor-in-Chief at Research Publisher in Santa Clara, CA for three journals and associated e-conferences. From 2011-2013 he was a Partner in Pion Capital, a hedge-fund partnership of Caltech alumni. In 2021 he was Editor-in-Chief of Int. J. Applied Math., Computat. Science and Systems Engin. From Feb 2013 through Dec 2021 he was a PI of XSEDE.org physics projects. From Apr 2021 he is a PI of SUNY Oookami supercomputer SUNY SB physics projects. Since 2005 through PSI he conducts

research in selected interdisciplinary projects.

## **OTHER PURSUITS**

### **Karate**

From 1958-1988 he founded and instructed karate classes at: Caltech, UC Berkeley, UC Los Angeles, SU New York at Stony Brook (SUNY SB), UC San Diego, PSI, and NPS. He has developed and published in several textbooks techniques promoting the learning of attentional skills in parallel with a physics approach to the learning of traditional physical skills. He received his black belt in karate in 1961 and became the first Westerner to receive the Instructor's degree from the Japan Karate Association (JKA) in 1968. Now he is an 8th Dan black belt. From 1989-1991 he was Director of Scientific Studies of the American JKA Karate Associations (AJKA). From 2008-2009 he was an 8th Dan Officer of The International Alliance for Shotokan Karate (IASK).

### **Married**

Since 1976 he and his spouse Louise Ingber have been partners in several projects, including running a ballet company and karate studio (1976-1985). He helps with cleanup for her chocolate and pastry business [ <https://creekhousechocolates.com> ].

2003-Current	Physical Studies Institute LLC	R&D, CEO
2023-Current	San Diego Supercomputer (SDSC.edu)	Principal Investigator
2021-Current	StonyBrook.edu (SUNY SB) Ookami supercomputer	Principal Investigator
2021-2021	Int. J. Applied Math., Computat. Science and Systems Engin.	Editor-in-Chief
2013-2021	Extreme Science Engineering Discovery Environment (XSEDE)	Principal Investigator
2011-2013	Pion Capital, Round Rock TX	Partner
2012-2012	Research Publisher	Editor-in-Chief 3 Journals
2002-2003	DUNN Capital Mgmt, Stuart FL	Director R&D
1997-2001	DRW Trading, Chicago	Director R&D
1989-1997	Physical Studies Institute	R&D
1989-1990	George Washington University Dept of Mathematics, DC	Research Professor
1989-1989	Naval Ocean Systems Center San Diego, CA	Senior Research Associate National Research Council NAS
1989-1989	USA Concepts Analysis Agency Bethesda, MD	Guest Professor Extended Temporary Duty
1986-1989	NPS Physics Dept GS-15 Step 10 Equiv.	Professor of Physics
1986-1988	ANSER (Nonprofit Lab) Arlington, VA	Consultant
1985-1986	Naval Postgraduate School (NPS) Monterey, CA	Senior Research Associate National Research Council NAS
1980-1986	UC San Diego, IPAPS	Research Associate
1972-1978	Physical Studies Institute	Director Alternative School
1970-1978	Physical Studies Institute San Diego, CA	President
1972-1974	UC San Diego, Music Dept	Research Associate
1972-1973	UC San Diego Extension	Director, Learning to Learn
1970-1972	UC San Diego, Physics Dept Institute for Pure & Applied Physical Sciences (IPAPS)	Asst. Research Physicist
1969-1970	SU New York Stony Brook Physics Department	Asst. Professor
1968-1969	UC Los Angeles, Physics Dept	NSF.gov Postdoctoral Fellow
1967-1968	UC Berkeley, Physics Dept	NSF.gov Postdoctoral Fellow Lecturer
1965-1966	RAND Corp., Santa Monica	Consultant
1962-1967	UC San Diego, Physics Dept	Research Assistant
1964-1964	UCSD/Niels Bohr Institute	
1960-1962	Caltech	Research Asst.: Metallurgy
1961-1962	Caltech	Grader: Math Physics (graduate)
1960-1961	Caltech	Grader: Algebra (undergraduate)