Lester Ingber

physicist with interdisciplinary expertise and interests

ingber@alumni.caltech.edu

Summary

https://www.linkedin.com/in/ingber has 30,000 Direct (Degree 1) Connections. (30,000 is the max presently permitted by LinkedIn.) Since 1965, I have published over 100 papers and books in the disciplines of: theoretical nuclear physics, neuroscience, finance, general optimization, combat analysis, karate, and education. A brief summary of my projects is in http://www.ingber.com/ingber_projects_brief.pdf . http://www.ingber.com contains papers and code on topics: ASA: Adaptive Simulated Annealing, Optimization, Importance Sampling, Nonlinear Systems, Stochastic Systems. COMBAT: Statistical Mechanics of Combat and Simulations. KARATE: The Art and Science of Karate, Applications to Learning. MARKETS: Statistical Mechanics of Financial Markets, Options, Risk, Portfolios, Trading. NEOCORTEX: Statistical Mechanics of Neocortical Interactions, Applications to Memory, EEG, Intelligent Systems. NUCLEAR: Nucleons, Nuclear Matter, Riemannian Interactions. PATH-INTEGRAL: Path Integrals in Stochastic Systems with Nonlinear Diffussion. More information is on LIR Products is on pages https://www.linkedin.com/company/lester-ingber-research-lir-/products and http://google.com/+Ingber . Specialties: My projects have been in theoretical nuclear physics, statistical mechanics of neocortical interactions (short-term memory and EEG correlates, AI), statistical mechanics of combat (baselining simulations to training), and statistical mechanics of financial markets (options, bond futures, risk management, and trading systems). I have developed algorithms for nonlinear stochastic systems, including ASA/VFSR & PATHINT/PATHTREE, a full suite of options code, and copula risk management. Principal Investigator (PI), National Science Foundation resource The Extreme Science and Engineering Discovery Environment (XSEDE.org), "Electroencephalographic field influence on calcium momentum waves".

Experience

Principal Investigator (PI) at Extreme Science and Engineering Discovery Environment (XSEDE)
February 2013 - Present (2 years 2 months)

I am Principal Investigator (PI), of the National Science Foundation (NSF.gov) collaborative supercomputer resource, The Extreme Science and Engineering Discovery Environment (XSEDE.org), project "Electroencephalographic field influence on calcium momentum waves". Work performed under an initial grant spanning 20 Feb 2013 - 19 Aug 2014 passed peer review for a second research grant spanning 1 Jul 2014 - 30 Jun 2015. A description of a current project and its sub-projects is in L. Ingber, M. Pappalepore, and R.R. Stesiak, ``Electroencephalographic field influence on calcium momentum waves," Journal of Theoretical Biology (2014). [URL http://www.ingber.com/smni14_eeg_ca.pdf] . A 5-minute audio-slide presentation accompanying this paper can be accessed at http://www.ingber.com or http://dx.doi.org/10.1007/s12559-011-9105-4 . Reviews of this project are at http://www.ingber.com/

smni14_eeg_ca_JTB_reviews.txt , and some press releases are at https://www.xsede.org/mechanism-of-short-term-memory , http://www.sdsc.edu/News%20Items/PR041414_short_term_memory.html , and http://ucsdnews.ucsd.edu/pressrelease/the_mechanism_of_short_term_memory . New papers/lectures in progress include: L. Ingber, ``Calculating consciousness correlates at multiple scales of neocortical interactions" [URL http://www.ingber.com/smni14_calc_conscious.pdf ]. L. Ingber, ``Influences on consciousness from multiple scales of neocortical interactions: Lecture plates," Report 2014:LEFI, Lester Ingber Research, Ashland, OR, (2014). [3rd World Neuroscience Online Conference 17 June 2014. URL http://www.ingber.com/smni14_conscious_scales_lect.pptx]

Physicist at Lester Ingber Research (LIR)

1989 - Present (26 years)

See the LIR page https://www.linkedin.com/company/lester-ingber-research-lir-/products I have worked through LIR intermittently between various positions in academia, government and business, as described in http://www.ingber.com/ingber_CV.pdf . See the LIR page https://www.linkedin.com/company/lester-ingber-research-lir-/products My Statistical Mechanics of Neocortical Interactions (SMNI) work since 1981 has detailed short-term memory and local generators of EEG. My 1983 Physical Review paper was the first paper accepted on the brain in this premier physics journal. 30+ SMNI papers have been published since then. I have published several papers in finance using algorithms I developed in computational physics. My 1990 Physical Review paper was the first paper accepted on finance in this premier physics journal. Tools have been developed to price complex projects as financial options with alternative schedules and strategies, in Real Options for Project Schedules (ROPS), http://www.ingber.com/markets07_rops.pdf . Risk management codes have been developed in Trading in Risk Dimensions (TRD) in http://www.ingber.com/markets_trd.pdf , published in Handbook of Trading, McGraw-Hill (2010). I regularly put aside time for anonymous or signed reviews, usually a few per month. Most of my reviews for 50+ journals or scientific agencies are of interdisciplinary subjects since my own interests have led me through a few interdisciplinary projects. Such reviews often have a different nature than reviews in relatively well-established disciplines where expert opinions can be considered definitive.

4 recommendations available upon request

Partner at Pion Capital

June 2011 - December 2013 (2 years 7 months)

Pion Capital is a hedge-fund Partnership of Caltech Alumni (http://pioncapital.com). I helped this early-stage start-up by representing them as a Partner to vendors to get good pricing for datafeeds and co-location of their systems, and by building interfaces for such feeds. I benchmarked some of my own TRD trading systems in their formats. I worked on various administrative and R&D projects.

Editor-in-Chief at Research Publisher

February 2012 - December 2012 (11 months)

I was EiC of three journals for Research Publisher, and recruited and formed their Editorial Boards: Current Progress Journal with associated e-conferences, on various selected topics Graduate Journal of Research with associated e-conferences Undergraduate Journal of Research with associated e-conferences

Director R&D at DUNN Capital Management

January 2002 - July 2003 (1 year 7 months)

I developed copula risk-management algorithms, and helped with analysis of other trading-related projects.

1 recommendation available upon request

Director R&D at DRW Trading

1997 - December 2001 (4 years)

I led teams developing multi-factor nonlinear stochastic models of markets, directly applied to options, bond futures, and various trading systems. I formulated "volatility of volatility" of markets and, using Eurodollars as an example, I developed PATHINT to explicitly calculate all Greeks for options, based on my 2-variable price-volatility model.

Research Professor of Mathematics at George Washington University (GWU)

1989 - 1990 (1 year)

Research

Professor of Physics at US Army Concepts Analysis Agency (CAA)

1989 - 1989 (less than a year)

Research

Senior Research Associate at National Research Council (NRC)

1989 - 1989 (less than a year)

Research

Professor of Physics at Naval Postgraduate School (NPS)

1986 - 1989 (3 years)

http://www.ingber.com/combat93_c3sci.pdf summarizes a series of papers started in 1985, which led to the baselining of JANUS(T) simulation to National Training Center (NTC) data. I was Principal Investigator (PI) of an Army contract, leading a team of scientists and officers to develop mathematical comparisons of Janus computer combat simulations with exercise data from NTC, developing a testable theory of combat successfully baselined to empirical data.

Consultant at ANSER

1986 - 1988 (2 years)

Research

Senior Research Associate at National Research Council (NRC)

1985 - 1986 (1 year)

Research

Research Associate, Physics at UC San Diego (UCSD)

1980 - 1986 (6 years)

Research with Physics Department and Institute for Pure and Applied Physical Sciences (IPAPS)

1 recommendation available upon request

President at Physical Studies Institute (PSI)

1970 - 1986 (16 years)

PSI, a CA nonprofit corporation, via UCSD/IPAPS agency account 1970-1986: Published research in physics, neuroscience, and finance. Paper in 1981 led to Physical Review's (premier physics journal's) first paper on the brain in 1983. Paper in 1984 led to Physical Review's first paper in finance in 1990. Institute for Study of Attention (ISA) (educational branch of PSI) alternative school 1970-1978: Founded, funded, directed, instructed, and managed instructors in over 30 courses (see ``Attention, physics and teaching,'' http://www.ingber.com/smni81_attention.pdf). ISA karate classes 1970-1986: Instructed thousands of students and wrote three karate texts. Conservatory of Ballet Arts Company (CBAC) from 1976-1985 was another branch of PSI directed by Louise Ingber (http://louise.ingber.com).

Research Associate, Music at UC San Diego (UCSD)

1972 - 1974 (2 years)

Research with Music Department with Pauline Oliveros

Director Learning To Learn at UC San Diego (UCSD) Extension

1973 - 1973 (less than a year)

See ``Editorial: Learning to learn,'' http://www.ingber.com/smni72_learning.pdf

Asst Professor of Physics at State University of New York (SUNY) at Stony Brook

1969 - 1970 (1 year)

Research and Teaching

National Science Foundation Postdoc Fellow at UC Los Angeles (UCLA)

1968 - 1969 (1 year)

Research

Sensei at Japan Karate Association (JKA)/All America Karate Federation (AAKF)

January 1968 - December 1968 (1 year)

I was the first graduate of the Japan Karate Association (JKA)/All America Karate Federation (AAKF) Sensei/Instructor's School, taught by Hidetaka Nishiyama in 1968. My thesis was Physics of Karate Techniques. A photo taken in 1972 is at http://www.ingber.com/karate72_encinitas.jpg .

National Science Foundation Postdoc Fellow at UC Berkeley (UCB)

1967 - 1968 (1 year)

Research

Consultant at RAND Corporation
1965 - 1966 (1 year)
I worked with friend and colleague Hal T. Yura on Collective Interactions Between Light and Matter.

Reader, Mathematical Physics (graduate level) at California Institute of Technology (Caltech)
1961 - 1962 (1 year)
I graded homeworks and exams.

Research Assistant Metallurgy at California Institute of Technology (Caltech)
1960 - 1961 (1 year)
I conducted experiments in metallurgy.

Reader, Algebra (undergraduate level) at California Institute of Technology (Caltech)
1960 - 1961 (1 year)
I graded homeworks and exams.

Projects

How I Think
March 1941 to Present
Members:Lester Ingber

Every since I got my skull cracked open by a spoon during an argument over a red truck when I was about two years old, I've had problems holding on to chains of thought. I quickly learned to compensate by "thinking" in overlapping patterns, so that whenever such a lapse occurs, I just about always can quickly reconstruct my chain of thought. At a certain age, like mine at 70+, these are often described as "senior moments," but I have had these moments all my life. I think this has turned into a asset, making me very creative in all my endeavors, as I uncover new patterns of information relying on such processes more than most people do, instead of having to be led by logic.

Electroencephalographic field influence on calcium momentum waves
February 2013 to Present
Members:Lester Ingber

Principal Investigator, National Science Foundation supercomputer resource The Extreme Science and Engineering Discovery Environment (XSEDE.org), PHY130022, "Electroencephalographic field influence on calcium momentum waves". See L. Ingber, M. Pappalepore, and R.R. Stesiak, ``Electroencephalographic field influence on calcium momentum waves," Journal of Theoretical Biology (2014). [URL http://www.ingber.com/smni14_eeg_ca.pdf] and http://ingber.com/smni14_eeg_ca.pdf and http://ingber.com/smni14_eeg_ca_lect.pptx , "Calculating consciousness correlates at multiple scales of neocortical interactions" (2014) [URL http://www.ingber.com/smni14_calc_conscious.pdf] , as well as http://www.ingber.com/lir_computational_physics_group.html .. A 5-minute audio-slide presentation accompanies

this paper. L. Ingber, ``Influences on consciousness from multiple scales of neocortical interactions," (2014) [URL http://www.ingber.com/smni14_conscious_scales.pdf ] L. Ingber, ``Influences on consciousness from multiple scales of neocortical interactions: Lecture plates," Report 2014:LEFI, Lester Ingber Research, Ashland, OR, (2014). [3rd World Neuroscience Online Conference 17 June 2014. URL http://www.ingber.com/smni14_conscious_scales_lect.pptx]

Skills & Expertise

Physics
Data Mining
Risk Management
Statistics
Simulations
Trading
Science
Artificial Intelligence
Mathematical Modeling
Trading Systems

Publications

http://www.ingber.com/ingber.ref.html
2012

Authors: Lester Ingber

Over 100 publications in several formats, including several disciplines: ASA: Adaptive Simulated Annealing, Optimization, Importance Sampling, Nonlinear Systems, Stochastic Systems. COMBAT: Statistical Mechanics of Combat and Simulations. KARATE: The Art and Science of Karate, Applications to Learning. MARKETS: Statistical Mechanics of Financial Markets, Bond Futures, Options, Risk, Portfolios, Trading. NEOCORTEX: Statistical Mechanics of Neocortical Interactions, Applications to Memory, EEG, Intelligent Systems. NUCLEAR: Nucleons, Nuclear Matter, Riemannian Interactions. PATH-INTEGRAL: Path Integrals in Stochastic Systems with Nonlinear Diffusion. http://www.ingber.com/ingber.ref.html Converted from ref: http://www.ingber.com/ingber.bib.html No header, footer or html/text: http://www.ingber.com/ingber.bib http://www.ingber.com/ingber.ref Approximate conversions: http://www.ingber.com/ingber.end http://www.ingber.com/ingber.ris http://www.ingber.com/ingber.xml

Adaptive Simulated Annealing (ASA)
Lester Ingber Research 1989

Authors: Lester Ingber

I maintain and and update my ASA code, originally Very Fast Simulated Reannealing (VFSR) until 1993, available at no charge from my archive http://www.ingber.com (mirrored at http://alumni.caltech.edu/~ingber). Mirrors of the ASA code are at http://asa-caltech.sourceforge.net and https://code.google.com/p/adaptive-simulated-annealing .

Karate Texts and Videos
Lester Ingber 1982

Authors: Lester Ingber

http://www.youtube.com/user/ingber#p/p has videos of a series of karate seminars that developed material for my book Elements of Advanced Karate http://www.ingber.com/karate85_book.html . I have two other books there as well, The Karate Instructor's Handbook http://www.ingber.com/karate76_book.html and Karate: Kinematics and Dynamics http://www.ingber.com/karate81_book.html , together with a running karate correspondence on http://www.ingber.com/karate.html .

Extended Reviews

2010

Authors: Lester Ingber

In addition to being a reviewer for about 50 scientific journals for about the same number of years, sometimes I do extended reviews, e.g., working with colleagues who are writing books. Some recent books containing acknowledgments for such collaboration are: Paul L. Nunez, "Brain, Mind, and the Structure of Reality" (Oxford U Press, London, 2010). Emeric Arus, "Biomechanics of Human Motion: Application in the Martial Arts" (CRC Press, Boca Raton, FL, 2013).

Recent Papers

2012

Authors: Lester Ingber

L. Ingber, M. Pappalepore, and R.R. Stesiak, ``Electroencephalographic field influence on calcium momentum waves," Journal of Theoretical Biology (to be published)(2014). [ URL http://www.ingber.com/smni14_eeg_ca.pdf ] L. Ingber, ``Electroencephalographic (EEG) influence on Ca2+ waves," Report 2013:LEFI, Lester Ingber Research, Ashland, OR, (2013). [2nd World Neuroscience Online Conference 18 June 2013. URL http://www.ingber.com/smni13_eeg_ca_lect.pptx] P.L. Nunez, R. Srinivasan, and L. Ingber, ``Theoretical and experimental electrophysiology in human neocortex: Multiscale correlates of conscious experience," in Multiscale Analysis and Nonlinear Dynamics: From genes to the brain, edited by M.M. Pesenson (Wiley, New York, 2013), p. 149-178.

Brief Bio

2012

Authors: Lester Ingber

Brief Bio http://ingber.wordpress.com Full resume http://ingber.com/ingber_CV.pdf

Google Plus http://google.com/+LesterIngber/about

Lester Ingber November 1, 2013

Authors: Lester Ingber

Lester Ingber

Facebook http://www.facebook.com/lester.ingber/about

Lester Ingber November 1, 2013

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Lester Ingber

Education

University of California, San Diego

PhD, Theoretical Nuclear Physics, 1962 - 1967

Activities and Societies: President, Organization Of Organizations. Founder, Karate Club/Classes. Karate Instructor: Hidetaka Nishiyama.

Niels Bohr Institute

Theoretical Nuclear Physics, 1964 - 1964

Activities and Societies: N/A

Caltech

B.S., Physics, 1958 - 1962

Activities and Societies: Kelman Scholar, 4 years. Captain, Caltech Karate Club. Karate Instructors: Tsutomu Ohshima and Hidetaka Nishiyama.

Brooklyn Technical High School (BTHS)

Diploma, college prep, 1954 - 1958

Activities and Societies: Chief Justice, Student Court. New York State Merit Scholar. Senior Project: Electroluminescence, special award from American Institute of Physics. I am the Founder of the Brooklyn Technical High School LinkedIn Group, for alumni and frirends of BTHS, and served as Manager 2008-2014. Go to http://www.linkedin.com/e/gis/53791 to join.

Honors and Awards

Brooklyn Technical HS 1955-1958: Justice -> Chief Justice, Student Court. Honorable Mention, New York Science Exam 1957. New York State Merit Scholar 1958. Caltech, Kelman Scholar 1958-1962. Sigma Pi Sigma, Physics Honor Society 1961-. Sigma Xi, Scientific Research Society 1963-. UCSD, President, Organization of Organizations 1965. Security Clearances: Secret -> Top Secret/SCI/CNWDI 1965-1966, 1986-1990. National Science Foundation (NSF), Postdoctoral Fellow, UCB & UCLA 1967-1969. Japan Karate Association (JKA), First Westerner to receive Instructor's degree, Thesis: Physics of Karate Techniques 1968. UCSD Honorary Researcher: Music Department 1972-1974. National Research Council (NRC), Senior Research Assoc, NPS & NOSC 1985-1986 & 1989. U.S. Senior Executive Service (SES) 1988; Selected as JTC3A/DCA Asst Director (I declined). Mensa 2008-2013

Interests

100+ publications -> ASA: Adaptive Simulated Annealing, Optimization. COMBAT: Statistical Mechanics of Combat and Simulations. KARATE: The Art and Science of Karate (8th Dan), Applications to Learning. MARKETS: Statistical Mechanics of Financial Markets. NEOCORTEX: Statistical Mechanics of Neocortical Interactions. NUCLEAR: Nuclear Physics. PATH-INTEGRAL: Path Integrals in Nonlinear Stochastic Systems. Reviewer, Scientific Journals (40+)

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LinkedIn

6 people have recommended Lester

"I first met Lester in 1989 while I was on the Neurology faculty at the University of South Alabama and was in San Diego as Senior Research Fellow for the Office for Naval Research. We have had many meetings since that time with stimulating conversations, mostly regarding theoretical neuroscience. I have read many of his papers and assimilated their concepts into my global view of brain function. Lester is cutting edge in his thinking and ability to translate ideas into working models with results that correlate with experimental results in the real world under a variety of perturbed conditions. I give him the highest recommendation for any collaborative project."

— Ken Pilgreen, *Senior Scientist and Neurologist, Jacksonville Neuroscience*, worked with Lester at Lester Ingber Research (LIR)

"Mr Ingber (AKA "Ingber Sensei") broke new ground in several areas of Karate study internationally. His work has inspired many of us over the years. Additionally, I have an appreciation for his work in the financial field, having myself worked in the financial industry for nearly 20 years. He is truly a wealth of knowledge."

— Jon Keeling, *Chief Instructor, JKA of Silicon Valley*, was with another company when working with Lester at Lester Ingber Research (LIR)

"Dr. Lester Ingber is a pioneer in a branch of science called "econophysics", which deals with linking statistical mechanics and financial markets. His theory is widely respected and cited in the literature. In 2001 I was a guest editor for the IEEE Transactions on Neural Networks, a special issue on Neural Networks in Financial Engineering. I invited Lester to submit and publish a research paper in the issue, which ultimately contained a compilation of the best research in this area of computational modeling of financial markets. Lester has written an excellent article, and it was a valuable contribution to the special issue."

— Amir Atiya, was Lester's client

"Lester and I both have physical science backgrounds, but independently became interested in the neurosciences in the 1970s. Lester is one of the smartest guys I know; his contributions to theoretical neuroscience creatively employ modern methods of statistical physics to brain dynamics. Lester is fun to work with. I am a secondary author on several of his papers, and he contributed a very innovated chapter to my 1995 book, Neocortical Dynamics and Human EEG Rhythms."

— Paul L. Nunez, Ph.D., *Professor and Director, Department of Biomedical Engineering, Tulane University,Brain Physics Group*, worked with Lester at Lester Ingber Research (LIR)

"Lester always brings a superb combination of pure intellect, inventiveness and quiet good humor to the office. His knowledge of math, statistics, modeling and capital markets is unmatched in my experience. As a person who is naturally respected by his colleagues, he is both a great leader and professional partner."

— James Cypher, *Director of Sales and Marketing, DUNN CAPITAL MANAGEMENT, LLC*, worked with Lester at DUNN Capital Management

"A brilliant researcher, Lester Ingber Illuminated the study of attention for me when I studied Karate with him in the 1970s. I got a taste of physics from his way of explaining Karate moves in terms of mass, energy and momentum. Lester's books and papers and his web site are rich resources for the community of interdisciplinary scientists. Lester's contributions are informed by the disciplines of Karate, mathematics and theoretical physics. He is a formidable leader influencing many over the years without the benefits and/or restrictions of an institutional base. I highly value the years that we shared ideas that were and are important to me in my music."

— Pauline Oliveros, *Professor of Music, UC San Diego (UCSD)*, worked directly with Lester at UC San Diego (UCSD)

Contact Lester on LinkedIn