Biographical Sketch and Curriculum Vitae August 2023

NAME	POSITION TITLE
Larry L. Smarr, Ph.D	Distinguished Professor Emeritus, Computer Science and Engineering, UC San Diego
https://lsmarr.net/	

EDUCATION/TRAINING INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of Missouri	B.A.	1970	Physics
University of Missouri	M.S.	1970	Physics
Stanford University	M.S.	1972	Physics
University of Texas at Austin	Ph.D.	1975	Physics

Ph.D. Dissertation

"The Structure of General Relativity with a Numerical Illustration: The Collision of Two Black Holes," University of Texas at Austin (1975). Ph.D. Advisor Bryce S. DeWitt (Deceased)

Positions and Employment

2020-present Distinguished Professor Emeritus, Computer Science and Engineering, UC San Diego
2012-2020 Distinguished Professor, Computer Science and Engineering, UCSD
2000-2011 Professor, Computer Science and Engineering, UCSD
2000-2020 Founding Director, California Institute for Telecommunications and Information Technology, UCSD
1997-2000 Founding Director, National Computational Science Alliance, Univ. of Illinois at Urbana-Champaign
1985-2000 Founding Director, National Center for Supercomputing Applications, UIUC
1985-2000 Professor, Astronomy and Physics Departments, UIUC
1981-1985 Associate Professor, Astronomy and Physics Departments, UIUC
1979-1980 Assistant Professor, Astronomy and Physics Departments, UIUC
1978-1979 Research Affiliate, Department of Physics, Yale University
1976-1979 Junior Fellow, Harvard University Society of Fellows, Departments of Physics and Astronomy
1975-1976 Postdoctoral Fellow and Lecturer, Princeton University Observatory

Honors

- CENIC 2017 Founders Circle Award [with Celeste Anderson, Mark Boolootian, John Dundas III, Sherilyn Evans, Cliff Frost, Tom Hutton, Sidney Karin, Johanna Madjedi, Bill Manning, David Reese, Tad Reynales, Lea Roberts, Michael Sinatra, Wayne Sung, Michael Van Norman, Jim Warner] (2017)
- Fellow, American Association for the Advancement of Science (2016)
- CENIC 2016 Innovations in Networking Award for Experimental Applications: Pacific Research Platform [with Tom DeFanti, Phil Papadopoulos, Frank Wuerthwein, Camille Crittenden, John Graham, John Hess, and Eli Dart] (2016)
- Golden Goose Award (2014)
- Name added to University of Missouri Notable Alumni Wall (2010)
- CENIC 2009 Innovation Award for Experimental/Developmental Applications: GreenLight [with Tom DeFanti and Greg Hidley] (2009)
- Listed as one of 30 Notable Graduate Alumni of the University of Missouri (2009)
- Honorary Ph.D. "Doctor of Science Honoris Causa," by the Univ. Missouri at Columbia. (2008)
- Australia Leadership Dialog Scholar (2008)
- R Systems, a company in Urbana, IL, names their supercomputer 'R Smarr' after Larry Smarr (2008)
- IEEE Computer Society Tsutomu Kanai Award for distributed computing systems achievements (2006)
- ESRI Lifetime Achievement Award (2006)
- USC Annenberg Fellow, May (2006-2008)

- CENIC Innovation Award for Experimental / Developmental Applications – iGrid2005 [with Maxine Brown and Tom DeFanti] (2005)
- Telluride Tech Festival Honoree (2005)
- Harry E. Gruber Endowed Chair, Department of Computer Science and Engineering, UCSD (2002-2020)
- Champaign County Most Valuable Citizen Award, Champaign County Chamber of Commerce (1998)
- Member, National Academy of Engineering, Section 5 (Computer Science and Engineering) (1995)
- Fellow, American Academy of Arts and Sciences (1994)
- Listed in Fortune Magazine, Special Issue, Spring/Summer 1991, "The New Century" in the article "Twenty Five Who Help The U. S. Win" (1991)
- Franklin Institute's Delmer S. Fahrney Gold Medal for Leadership in Science or Technology (1990)
- Fellow, American Physical Society (1988)
- Distinguished Alumnus Award, College of Arts & Science, Univ. Missouri at Columbia (2nd recipient) (1985)
- Included in Esquire magazine's "Register of Outstanding Americans Under Age 40" (272 listed) (1984)
- Alfred P. Sloan Research Fellow (1980-1984)
- Max-Planck Institute for Physics and Astrophysics Fellowship (1982-1983)
- Beckman Fellow, University of Illinois at Urbana-Champaign (1980-82)
- Junior Fellow, Harvard University (1976-1979)
- Lane Scholar [outstanding work in classical physics at U. Texas] (1973-1974)
- National Science Foundation Fellow (1970-1973)
- Woodrow Wilson Independent Study Award [top 10% of W. W. Fellows] (1971)
- Woodrow Wilson Fellow (1970)

Service

- Member, Computing Sciences and Computational Research Division Review Committee at Lawrence Berkeley National Laboratory (2019)
- Member, Advisory Board to the Director of the Lawrence Berkeley National Laboratory (2016-2022)
- Member, DOE ESnet Policy Board (2012-2015)
- Chair, NSF Advisory Committee for Cyberinfrastructure (2011-2013)
- Member, NSF and Consortium for Ocean Leadership's Ocean Observatories Initiative (OOI) Deans/Directors Oversight Board (2010-2013)
- Chair, Information Technology Subcommittee to the NASA Advisory Council to the NASA Administrator, (2010-2013)
- Member NSF Alan T. Waterman Award Committee (2009-2014)
- Member, ACM Ken Kennedy Award Committee (2010-2013)
- Member, Board of Directors, Institute for the Future (2009-2010)
- Member, DOE Office of Science Advanced Scientific Computing Advisory Committee (2008-2011)
- Member, Encyclopedia of Life Distinguished Advisory Board (2008-2010)
- Member, Editorial Advisory Board, IEEE Spectrum (2006-2012)
- Member, Gov. Schwarzenegger's California Broadband Task Force (2006-2007)
- Chair, NASA Earth System Science & Applications Advisory Committee [ESSAAC] (2003-2005)
- Member, NASA Advisory Council to the NASA Administrator (2001-2005; 2011-2013)
- Member, NewsHour Science Advisors (2004-2009)
- Member, San Diego CONNECT Board of Directors (2006-2016)
- Member, CommNexus San Diego Board of Advisors (2006-2010)
- Member, San Diego Telecom Council Board (2003-2005)
- Outside Director, Board of Directors, Nonprofit Corporation for Education Network Initiatives in California [CENIC] (2001-present)
- Chair of University of Texas at Austin Visiting Committee on Visualization (2001)
- Member, Advisory Committee to the Director, NIH (1998-2005)
- Member, Board of Governors, Argonne National Laboratory (1998 - 2001)
- Member, President's Information Technology Advisory Committee [PITAC] (1997-2000)

- Program Chair, ACM/IEEE Supercomputing '95 (1995)
- Member, National Research Council Committee to Study High Performance Computing and Communications: Status of a Major Initiative, CSTB, (1995)
- Member, National Research Council, Commission on Geosciences, Environment, and Resources (1990-1994)
- Panel Chair, National Research Council Computing and Data Processing, Astronomy and Astrophysics Survey Committee (1990 – 1991)
- Member, Office of Technology Assessment Advisory panel on Basic Research in the 1990s (1990)
- Member, National Research Council, Commission of Physical Sciences, Mathematics, & Resources (1987-1990)
- Member, National Academy of Sciences Government-University-Industry Research Roundtable (1987-1991)
- Member, National Academy of Sciences Panel on Science and Technology Centers, (1987)

Research Support (last 20 years)

These grants support my research and do not include institutional grants to create/maintain NCSA & Calit2.

Ongoing Research Support

- Co-PI on the NSF CCRI Enhance/Sustain (ENS) Award for the CHASE-CI grant [NSF Award CNS-2120019, PI Tom DeFanti] (2021-2024, $1,800,000) to support the enhancement and sustainment of the CHASE-CI CISE community infrastructure to enable world-class CISE research opportunities for broad-based communities of CISE researchers.
- PI on the NSF *Toward the National Research Platform* (TNRP) grant [NSF Award OAC-1826967] (2018-2023, $2,500,000) to extend the PRP across the country by federating with four other Regional Optical Networks and Internet2.

Completed Research Support

- PI on the NSF Community Research Infrastructure (CCRI) *Accomplishment Based Renewal (ABR) for the CHASE-CI* grant [NSF Award CNS-2100237] (2021-2023, $1,000,000) to study various Deep Neural Network, Recurrent Neural Network, and Reinforcement Learning Algorithms on the CHASE-CI platform.
- PI on the NSF *Cognitive Hardware and Software Ecosystem Community Infrastructure (CHASE-CI)* grant [NSF Award CNS-1730158] (2017-2020, $1,200,000) to add machine learning to the PRP platform to enable research by 30 faculty at 10 of the PRP universities.
- PI on NSF *Pacific Research Platform* grant [NSF Award OAC-1541349] (2015-2022, $8,000,000) to create a sub-national scale Big Data Freeway system connecting investigators in their labs to big data sources and big compute at 10-100 Gbps
- PI on the Helmsley Charitable Trust grant *3D Medical Imaging Pilot to Improve Surgical Outcomes for Patients with Crohn's Disease* grant (2018-2021, $1,200,000) to develop novel machine learning algorithms to find the 3D surface of the large intestine in ten patients starting from abdominal MRI slices.
- Co-PI on NSF *WIFIRE: A Scalable Data-Driven Monitoring, Dynamic Prediction and Resilience Cyberinfrastructure for Wildfires* Hazards SEES Type 2 grant [NSF Award OAC-1331615, PI Ilkay Altintas, UCSD] (2014-2016, $2,650,000) to build an end-to-end cyberinfrastructure, called WIFIRE, for real-time and data-driven simulation, prediction, and visualization of wildfire behavior.
- Co-PI on NSF *PRISM@UCSD* grant [NSF Award OAC-1246396, PI Philip Papadopoulos, UCSD] (2013-15, $500,000) to build a UCSD Big Data freeway system for research data.
- PI on NSF *Wildfire Modeling and Prevention Initiative: Developing a Technical Framework for Integrating Research with Public Policy Decision Support* EAGER grant [NSF Award OCI-1126615] (2011-2012, $260,000)
- Co-PI on NSF *GreenLight* grant (2008-2010, $2,000,000) [NSF Award CNS-0821155, PI Thomas DeFanti, UCSD] to develop an instrument called GreenLight which can measure, monitor, and optimize the energy consumption of large-scale scientific computational workloads from many different disciplines.
- PI on Moore Foundation *Community Cyberinfrastructure for Advance Microbial Ecology Research and Analysis (CAMERA)* grant (2005-2014, $25,500,000) to establish a community resource with a central genomic/metagenomics data repository and a suite of tools for analysis/visualization that provides open, easy access to the international scientific community studying marine microbial ecology, the microbial ecology of other natural environments, and evolutionary biology.
- Co-PI on NSF *LOOKING* grant [NSF Award OCE-0427974, PI John Orcutt] (2004-2008, $2,300,000) to develop and prototype new cyberinfrastructure approaches for ocean observing systems.

- Co-PI on NSF *Quartzite* grant [NSF Award CNS-0421555, PI Philip Papadopoulos, UCSD] (2004-2007, $1,200,000) to build a campus wide ultra-high-speed optical fiber network that supports data-intensive scientific application, develops an experimental next-generation instrument to efficiently investigate and compare campus-scale terabit-class lambda network architectures that span from optical-circuits-only to packet-switched-only networks
- PI on NSF *OptIPuter* grant [NSF Award OAC-0225642] (2002-2009, $13,500,000) to design and build an "OptIPuter," which is a "virtual" parallel computer in which the individual "processors" are widely distributed clusters; the "backplane" is provided by IP delivered over multiple dedicated lambdas (each 1-10 Gbps); and, the "mass storage systems" are large distributed scientific data repositories, fed by scientific instruments as OptIPuter peripheral devices, operated in near real-time.

Private Sector Engagement

- Kazuhm, Technology Evangelist (2020-21)
- Member, Analytic Ventures Lab Advisory Board (2017-2021)
- Member, Scientific Advisory Board, Arivale (2015-2019)
- San Diego Xconomy Xconomist (2008-2019)
- Member, Scientific Advisory Board, MDRevolution (2012-2015)
- Member, Complete Genomics Inc. Scientific Advisory Board (2010-2014)
- Advisor to the CEO, MedExpert International, Inc. (2000-2017)
- Member, Qualcomm Life Advisory Council (2012-2014)
- Member, Future in Review Advisory Board (2008-2010)
- Member, Seattle OVP Venture Partners Technology Advisory Group (2006-2010)
- Fellow, Price Waterhouse Coopers Exchange (2010-2020)
- Fellow, Diamond Management & Technology Consultants, Inc. DiamondExchange Program (2009-2010)
- Advisory Board Member, Kintera, Inc. (2000-2008)
- Member, InterWest MedTech Advisory Committee (1999-2010)
- Member, Board of Directors, and Chair, Scientific Advisory Board, Entropia, Inc. (1998-2003)
- Member, Technical Advisory Board, WebEx Communications, Inc. (1999-2003)
- Consultant, SAIC (2000-2003)
- Member, Fisher Scientific Biotechnology Council (1993-1998)
- Consultant to Ab Initio, Boston, MA (1996-1998)
- Member, Vanguard Advisory Board, Computer Sciences Corporation, 1993-1997; Technology Transfer Institute 1998-1999 [Created quarterly IT frontier programs for Industrial CIOs]
- Executive Committee, World Space Center (1977 - 1980)

Courses taught

- "The Interstellar Medium," Senior Level Undergraduate Semester Course, Department of Astrophysical Sciences, Princeton University, Spring 1975.
- "Black Holes," Undergraduate Semester Course, Department of Astronomy, University of Illinois, Fall 1983 and 1984.
- "General Relativity," Graduate Semester Course, Departments of Physics and Astronomy, University of Illinois, Fall 1981 and 1983.
- "The Physical Universe," Undergraduate Semester Course, Department of Astronomy, University of Illinois, Spring 1980, 1981 and 1983.
- "Descriptive Astronomy," Undergraduate Semester Course, Department of Astronomy, University of Illinois, Spring 1982 and Fall 1982.
- "Thought and Structure in Physical Science," Undergraduate Semester Course, Department of Astronomy, University of Illinois, Fall 1979 and 1980

Contributions to Science

A summary of the major phases in my research career with selected publications. Those with * at the end currently have between 10 and 50 citations each in Google Scholar and those with ** have between 50 and 700 citations. https://scholar.google.com/citations?user=oZafLf4AAAAJ&hl=en).

For my full set of publications, government reports, other works, presentations, interviews and profiles, see http://lsmarr.calit2.net.

Analytic and Computational General Relativity. I began my scientific career in 1970, just two years after the term "black hole" was coined. This early entry into the rapidly developing field enabled me to discover what is now termed the Smarr Mass Formula for black holes. I was also the first to determine the intrinsic curvature deformation caused by rotation in black holes. Although the numerical solution of perturbations of spherical and rotating black holes had been well developed, the solution of the full nonlinear Einstein equations utilizing Cauchy evolution by computational solution of partial differential equations required a number of Riemannian geometry innovations that my co-workers and I developed. Working under the mentorship of general relativity and quantum gravity pioneer Bryce DeWitt, I helped found the field of numerical relativity by amalgamating techniques from differential geometry, general relativity, numerical analysis, and computer graphics and applying them to the two-body problem in general relativity in the form of the head-on collision of two black holes. This led to the first computation of the gravitational radiation from colliding black holes. With my students and colleagues, I also also computationally investigated black hole dynamics, gravitational collapse, and black hole/gravitational wave interactions.

1. "Surface Geometry of Charged Rotating Black Holes," L. Smarr, Physical Review D7, 289-295 (1973). **
2. "Mass Formula for Kerr Black Holes," L. Smarr, Physical Review Letters, 30, 71-73 (1973). **
3. "Maximally Slicing a Black Hole," F. Estabrook, H. Wahlquist, S. Christensen, B. DeWitt, L. Smarr and E. Tsiang, Physical Review D7, 2814-2817, (1973). **
4. "Collision of Two Black Holes: Theoretical Framework," L. Smarr, A. Cadez, B. DeWitt, and K. Eppley, Physical Review D14, 2443-2452 (1976) **
5. "Spacetimes Generated by Computers: Black Holes with Gravitational Radiation," L. Smarr, Ann. N.Y. Acad. of Sciences, 302, 569-604 (1977) **
6. "Gravitational Radiation from Distant Encounters and Head-On Collisions of Black Holes: The Zero Frequency Limit," L. Smarr, Physical Review D15, 2069-2077 (1977). **
7. "Are There Geon Analogues in Sourceless Gauge-Field Theories?" S. Coleman and L. Smarr, Comm. Math. Phys., 56, 1-9 (1977). *
8. "The Radiation Gauge in General Relativity," L. Smarr and J. W. York, Jr., Physical Review D17, 1945-1956 (1978). **
9. "Kinematic Conditions in the Construction of Spacetime," L. Smarr and J. W. York, Jr., Physical Review D17, 2529-2551 (1978). **
10. "Sources of Gravitational Radiation," ed. L. Smarr (Cambridge University Press) (1979). **
11. "Gauge Conditions, Radiation Formulae, and the Two Black Hole Collision," in Sources of Gravitational Radiation, 245-274, ed. L. Smarr (Cambridge University Press) (1979). *
12. "Time Functions in Numerical Relativity: I. Marginally Bound Dust Collapse," D. Eardley and L. Smarr, Physical Review D19, 2239-2259 (1979). **
13. "Gravitational Waves and Red Shifts: A Space Experiment for Testing Relativistic Gravity Using Multiple Time-Correlated Radio Signals," L. Smarr, R. F. C. Vessot, C. A. Lundquist, R. Decker and T. Piran, General Relativity and Gravitation, 15, 129-163 (1983). *
14. "The Contribution of Bryce DeWitt to Classical General Relativity," in Ahead of His Time: Bryce S. DeWitt. Essays on the Quantum Theory of Gravity in Honor of his 60th Birthday, ed. S. Christensen (Adam Hilger, Lmt.: Bristol, England) (1984).
15. "Computational Relativity: Numerical and Algebraic Approaches," L. Smarr, in The Proceedings of the 10th International Conference on General Relativity and Gravitation, 163-183, ed. B. Berotti et al. (Reidel: Dordrecht) (1984).
16. "Numerical Construction of Spacetime," L. Smarr, Proc. R. Soc. Lond., 368, 15-16, (1979).

17. “Numerical Relativistic Gravitational Collapse with Spatial Time Slices,” C.R. Evans, L.L. Smarr and J.R. Wilson, in Astrophysical Radiation Hydrodynamics, 481-519, ed. K.-H. Winkler and M. Norman (Reidel: Dordrecht) (1986).
18. "Black Hole Spacetimes: Testing Numerical Relativity," D. Bernstein, D. Hobill, L. Smarr, in Frontiers in Numerical Relativity, 57-73, ed. C. Evans, L. Finn, and D. Hobill (Cambridge University Press: Cambridge) (1989). *
19. "Supercomputing and Numerical Relativity: A Look at the Past, Present and Future," L. Smarr in Frontiers in Numerical Relativity, 1-17, ed. C. Evans, L. Finn, and D. Hobill (Cambridge University Press: Cambridge), with D. Hobill (1989).
20. “Shedding Light on Black Holes,” L. Smarr, D. Hobill and D. Bernstein, Future Generation Computer Systems, 5, 225-242 (1989)
21. “Numerical Relativity: Black Hole Spacetimes," L. Smarr, D. Hobill, D. Bernstein, D. Cox, and R. Idaszak, SIGGRAPH Video Review: Visualization State of the Art, 49, (1989).
22. "Numerically Generated Black Hole Spacetimes: Interaction with Gravitational Waves," A. Abrahams, D. Bernstein, D. Hobill, E. Seidel, and L. Smarr, Physical Review D15, 45, 3544, (1992). **
23. "Computing Dynamical Black Hole Spacetimes", D. Bernstein, D. Hobill, E. Seidel, L. Smarr, and J. Towns, in Proceedings of Supercomputer Symposium '92, Ottawa, Ontario, (1992).
24. "Numerically Generated Black Hole Spacetimes", D. Bernstein, D. Hobill, E. Seidel, and L. Smarr, in Proceedings of the 6th Marcel Grossmann Meeting on General Relativity, (1993).
25. "The Collision of Two Black Holes," P. Anninos, D. Hobill, E. Seidel, and L. Smarr, and W.-M. Suen, Physical Review Letters, 71, 2851 (1993). **
26. "Numerically Generated Axisymmetric Black Hole Spacetimes: Numerical Methods and Code Tests," D. Bernstein, D. Hobill, E. Seidel, L. Smarr, and J. Towns, Physical Review D15, 50, 5000, (1994). **
27. "Initial Data for The Black Hole Plus Brill Wave Spacetime," D. Bernstein, D. Hobill, E. Seidel and L. Smarr. Physical Review D15, 50, 3760, (1994). *
28. "Gravitational Waves from Oscillating Black Holes", P. Anninos, D. Bernstein, D. Hobill, J. Towns, E. Seidel, and L. Smarr, in Computational Astrophysics, Eds. J. Barnes et al. (Springer-Verlag: Berlin) (1994).
29. "Dynamics of Black Hole Apparent Horizons," P. Anninos, D. Bernstein, S. R. Brandt, D. Hobill, E. Seidel, and L. Smarr, Physical Review D15, 50, 3801, (1994). **
30. "Event Horizons in Numerical Relativity", P. Anninos, D. Bernstein, S. Brandt, J. Libson, J. Massó, E. Seidel, L. Smarr, W.-M. Suen, and P. Walker, in Proceedings of the 7th Marcel Grossmann Meeting on General Relativity, (1995).
31. "Dynamics of Apparent and Event Horizons," P. Anninos, D. Bernstein, S. Brandt, J. Libson, Joan Masso, E. Seidel, L. Smarr, W.-M. Suen, and P. Walker. Physical Review Letters, 74, 630 (1995) **
32. “Oscillating Apparent Horizons in Numerically Generated Spacetimes,” P. Anninos, D. Bernstein, S. Brandt, D. Hobill, E. Seidel, and L. Smarr, Australian Journal of Physics, 48, 1027, (1995). *
33. "The Head-On Collision of Two Equal Mass Black Holes," P. Anninos, D. Hobill, E. Seidel, L. Smarr, and W.-M. Suen. Physical Review D15, 52, 2044, (1995). **
34. "Geometry of a Black Hole Collision," R. Matzner, E. Seidel, S. L. Shapiro, L. Smarr, W.-M. Suen, S. Teukolsky, J. Winicour, Science 270, 941 (1995). **
35. "When Black Holes Collide,” P. Anninos, D. Hobill, E. Seidel, L. Smarr, and W.-M. Suen, in Proceedings of the Sixth Canadian Conference on General Relativity and Relativistic Astrophysics, Fields Institute Communications (1996).
36. “Head-on Collisions of Two Black Holes,” D. W. Hobill, P. Anninos, E. Seidel, L. Smarr, W.-M. Suen, in Computational Astrophysics; 12th Kingston Meeting on Theoretical Astrophysics; ASP Conference Series #123, edited by D. A. Clarke and M. J. West., p. 314 (1997).
37. "Gravitational Wave Extraction and Outer Boundary Conditions by Perturbative Matching,” A. M. Abrahams, L. Rezzolla, M. E. Rupright, A. Anderson, P. Anninos, T. W. Baumgarte, N. T. Bishop, S. R. Brandt, J. C. Browne, K. Camarda , M. W. Choptuik, G. B. Cook, C. R. Evans, L. S. Finn, G. Fox, R. Gomez, T. Haupt, M. F. Huq, L. E. Kidder, S. Klasky, P. Laguna , W. Landry, L. Lehner, J. Lenaghan, R. L. Marsa, J. Masso, R. A. Matzner, S. Mitra, P. Papadopoulos, M. Parashar, F. Saied, P. E. Saylor, M. A. Scheel, E. Seidel, S. L. Shapiro,

D. Shoemaker, L. Smarr, B. Szil´agyi, S. A. Teukolsky, M. H. P. M. van Putten, P. Walker, J. Winicour, J. W. York Jr., Physical Review Letters, 80, 1812 (1998). **

38. "Boosted Three-Dimensional Black-Hole Evolutions with Singularity Excision," G. B. Cook, M. F. Huq, S. A. Klasky, M. A. Scheel, A. M. Abrahams, A. Anderson, P. Anninos, T. W. Baumgarte, N. T. Bishop, S. R. Brandt, J. C. Browne, K. Camarda, M. W. Choptuik, C. R. Evans , L. S. Finni G. C. Fox, R. G´omez, T. Haupt, L. E. Kidder, P. Laguna, W. Landry, L. Lehner, J. Lenaghan , R. L. Marsa, J. Masso, R. A. Matzner, S. Mitra, P. Papadopoulos, M. Parashar, L. Rezzolla, M. E. Rupright , F. Saied, P. E. Saylor, E. Seidel, S. L. Shapiro, D. Shoemaker, L. Smarr, W. M. Suen , B. Szil´agyi, S. A. Teukolsky, Physical Review Letters, 80, 2512-2516 (1998). **
39. "Stable Characteristic Evolution of Generic 3-Dimensional Single-Black-Hole Spacetimes," R. Gomez, L. Lehner, R. L. Marsa, J. Winicour, A. M. Abrahams, A. Anderson, P. Anninos, T. W. Baumgarte, N. T. Bishop, S. R. Brandt, J. C. Browne, K. Camarda , M. W. Choptuik, R. R. Correl, G. B. Cook, C. R. Evans, L. S. Finn, G. C. Fox, T. Haupt, M. F. Huq, L. E. Kidder, S. A. Klasky, P. Laguna, W. Landry, J. Lenaghan, J. Masso, R. A. Matzner, S. Mitra, P. Papadopoulos, M. Parashar, L. Rezzolla, M. E. Rupright, F. Saied, P. E. Saylor, M. A. Scheel, E. Seidel, S. L. Shapiro, D. Shoemaker, L. Smarr, B. Szilagyi, S. A. Teukolsky, M. H. P. M. van Putten, P. Walker, J. W. York Jr., Physical Review Letters, 80, 3915-3918 (1998). **

Computational Astrophysics. My students and co-workers were able to extend these computational methods to include general relativistic hydrodynamics and magnetohydrodynamics and apply this new capability to the solution of fundamental problems such as accretion onto black holes, which powers galactic nuclei. My colleagues and I later used supercomputers to perform the first computations of colliding neutron stars, non-spherical supernova collapse, and extragalactic radio jets. All of these areas are flourishing computational astrophysical science fields today.

1. "Basic Concepts in Finite Differencing of Partial Differential Equations," in Sources of Gravitational Radiation, 139-159, ed. L. Smarr (Cambridge University Press) (1979). *
2. "General Relativistic Hydrodynamics: The Comoving, Eulerian, and Velocity Potential Formalism," L. Smarr, C. Taub, and J. R. Wilson, in Essays in General Relativity: A Festschrift for Abraham Taub, ed. F. Tipler, (Academic Press) (1980). *
3. "Rayleigh-Taylor Overturn in Supernova Core Collapse," L. Smarr, J. R. Wilson, R. T. Barton, and R. L. Bowers, Astrophysical Journal, 246, 515-525 (1981). **
4. "Hydrodynamical Formation of Twin-Exhaust Jets," M. L. Norman, L. Smarr, J. R. Wilson, and M. D. Smith, Astrophysical Journal, 247, 52-58 (1981). **
5. "Can the Twin-Exhaust Model Explain Radio Jets?" M. D. Smith, L. Smarr, M. L. Norman, and J. R. Wilson, Nature, 293, 277-279 (1981). *
6. "Structure and Dynamics of Supersonic Jets," M. Norman, K.-H. Winkler, L. Smarr, and M. Smith, Astron. & Astrophys., 113, 285-302, (1982). **
7. "Propagation and Morphology of Pressure-Confined Supersonic Jets, in Astrophysical Jets," M. Norman, K.-H. Winkler, and L. Smarr, 227-251, in Astrophysical jets; Proceedings of the International Workshop, Turin, Italy, ed. A. Ferrari and A. G. Pacholczyk (D. Reidel: Dordrecht) (1983). *
8. "Bubbles, Jets and Clouds in Active Galactic Nuclei," M. D. Smith, L. Smarr, M. L. Norman, and J. R. Wilson, Astrophysical Journal, 264, 432-445 (1983). *
9. "A Numerical Study of Non-Spherical Black Hole Accretion. I. Equations and Test Problems," J. Hawley, J. R. Wilson, and L. Smarr, Astrophysical Journal, 277, 296-311 (1983). **
10. "A Numerical Study of Nonspherical Black Hole Accretion. II. Finite Differencing and Code Calibration," J. Hawley, J. R. Wilson, and L. Smarr, Astrophysical Journal Suppl., 55, 211-246 (1984).
11. "General Relativistic Hydrodynamics and Accretion Physics: A Numerical Approach," J. Hawley and L. Smarr, 256-269, in Problems of Collapse and Numerical Relativity, ed. D. Bancel and M. Signore (Reidel: Dordrecht) (1984).
12. "Shocks, Interfaces and Patterns in Supersonic Jets," Smarr, L., Norman, M., Winkler, K.-H.. Physica 12D, 83-106. (1984)

13. “Knot Production and Jet Disruption via Nonlinear Kelvin-Helmholtz Pinch Instabilities,” M. Norman, K.-H. Winkler, and L. Smarr, in Physics of Energy Transport in Extragalactic Radio Sources, 150-168, ed. A. Bridle and J. Eilek (NRAO: Green Bank) (1985).
14. “Hot Spots in Radio Galaxies: A Comparison with Hydrodynamic Beam Cap Simulations,” M. Smith, M. Norman, K.-H. Winkler, and L. Smarr, Mon. Not. Royal Astronomical Soc., 214, 67-85 (1985). **
15. “Fluid Dynamical Mechanisms for Knots in Astrophysical Jets,” M. Norman, L. Smarr, and K.-H. Winkler, in Numerical Astrophysics, 88-126, ed. J. Centrella, J. LeBlanc, and R. Bowers (Jones and Bartlett: Boston) (1985). *
16. “General Relativistic Magnetohydrodynamics,” J. H. Sloan and L. L. Smarr, in Numerical Astrophysics, 52-68, ed. J. Centrella, J. LeBlanc, and R. Bowers (Jones and Bartlett: Boston) (1985).
17. “Numerical Models of Fat Disks: New Scenarios for Fluid Accretion into Black Holes,” J. Hawley and L. Smarr, in Numerical Astrophysics, 30-51, ed. J. Centrella, J. LeBlanc, and R. Bowers (Jones and Bartlett: Boston) (1985).
18. "New Paradigms for Black Hole Accretion from High Resolution Supercomputer Experiments," L. Smarr, in American Institute of Physics Conference Proceedings 144: Magnetospheric Phenomena in Astrophysics, 263-290, ed. R. I. Epstein and W. C. Feldman (American Institute of Physics: New York), with J. Hawley (1986). *
19. “An Approach to Complexity: Numerical Computations,” L. Smarr, Science, 228, 403-408 (1985). *
20. “Astronomical Computing in the 1990s: The Bahcall Committee Report,” W.H. Press and L. Smarr, Computers in Physics, 5, 180-190 (1991).

Theoretical and Observational Astronomy Studies. The lifetime evolution of binary stellar systems, including both changes in the component stars and the binary system itself, were studied with a focus on compact objects and gravitational radiation. With colleagues, I carried out astronomical observations with ground-based radio (VLA) and optical (Kitt Peak) telescopes at the NSF national observatories, as well as space-based x-ray (Einstein) satellites and integrated the findings into an updated understanding of our neighbor Andromeda galaxy.

1. “Mechanisms for Inducing Synchronous Rotation and Small Eccentricity in Close Binary Systems,” W. H. Press, L. Smarr, and P. Wiita, Astrophysical Journal Letters, 202, L135-L137 (1975). **
2. “The Binary Pulsar -- Physical Processes, Possible Companions, and Evolutionary Histories,” L. Smarr and R. Blandford, Astrophysical Journal, 207, 574-588 (1976). **
3. “Observations of X-Ray Sources in M31,” L. Van Speybroeck, A. Epstein, W. Forman, R. Giacconi, C. Jones, W. Liller, L. Smarr, Astrophysical Journal Letters, 234, L45-L49 (1979). **
4. “Dumbbell Galaxies and Precessing Radio Jets,” A. Wirth, L. Smarr, and J. S. Gallagher Astronomical Journal, 87, 602-615 (1982). **
5. “The Extended Radio Source in the Center of M31,” R. M. Hjellming and L. Smarr, Astrophysical Journal Letters, 257, L13-L18 (1982). *
6. “Why Dominant Cluster Jets are Different,” D. Sumi. and L. Smarr, 168, in Physics of Energy Transport in Extragalactic Radio Sources, ed. A. Bridle and J. Eilek (NRAO: Green Bank) (1984).
7. “The Missing Bulge Globular Clusters in M31: New Optical Candidates,” A. Wirth, L. Smarr, and T. L. Bruno, Astrophysical Journal, 290, 140-153 (1985). *
8. “Are the Inner Cores of Galaxy Clusters Dominated by Dark Matter?” D. Sumi. and L. Smarr, in Inner Space Outer Space: The Interface Between Cosmology and Particle Physics, 226-227, ed. E. Kolb, M. Turner, D. Lindley, K. Olive, and D. Seckel (Univ. of Chicago Press: Chicago), (1986).
9. “Degenerate Dwarf Binaries as Promising, Detectable Sources of Gravitational Radiation,” C. R. Evans, I. Iben, Jr., and L. Smarr, Astrophysical Journal, 323, 129-139 (1987). **
10. “Radio Jets as a Probe of the Cooling Flow Environment, in Cooling Flows in Clusters and Galaxies,” D. M. Sumi, M. L. Norman, L. Smarr, in Cooling Flows in Clusters and Galaxies; Proceedings of the NATO Advanced Research Workshop, Cambridge, England, 257-261, ed. A. C. Fabian (D. Reidel: Dordrecht) (1987).

Supercomputing Computational Science. My experience in the 1970s and early 1980s using supercomputers at Department of Energy labs and European centers convinced me that the National Science Foundation (NSF) needed to

make this capability widely available to university researchers. My unsolicited NSF proposal in 1983 helped define the need for what became the NSF Supercomputer Center program. In 1985 my proposal was funded and I became the founding director of the National Center for Supercomputing Applications (NCSA) at the University of Illinois at Urbana-Champaign. I oversaw bringing successive generations of high-performance computers to the national research community, first with vectors [Cray X-MP, Cray Y-MP, Convex], then massively parallel [Alliant, CM-2, CM-5], shared memory [SGI Challenge, Power Challenge, Origin], and finally large-scale superclusters. Based on these experiences, I co-authored a book on the scientific underpinnings of the many disciplines of science and engineering that were being transformed by this computational methodology.

1. "The Computational Science Revolution: Technology, Methodology, and Sociology," L. Smarr, in High-Speed Computing: Scientific Applications and Algorithm Design, ed. R. B. Wilhelmson (Univ. of Illinois Press: Urbana) (1988). *
2. "Supercomputing Opportunities for the Protein Sciences," L. Smarr, in Protein Folding: Deciphering the Second Half of the Genetic Code, eds. L. M. Gierasch and J. King (AAAS: Washington D.C.) (1990).
3. "Extraterrestrial Computing: Exploring the Universe with a Supercomputer," L. Smarr, in Very Large Scale Computation in the 21st Century, 100-117, ed. J. P. Mesirov (Society for Industrial and Applied Mathematics: Philadelphia) (1991).
4. "Supercomputing and the Transformation of Science," by William J. Kaufmann III and Larry L. Smarr. (Scientific American Library, W. H. Freeman and Company) ISSN 1040-3213. ** (1993)
5. “Where is the Supercomputer Software Revolution?” D. Gannon, L. Smarr, V. Schuster, Panel at the Conference on High Performance Networking and Computing archive Proceedings of the 1995 ACM/IEEE conference on Supercomputing (CDROM)
6. “Supercomputers: Directions in Technology, Architecture, and Applications”, L. Smarr, in Proceedings of Supercomputing ’98 in Mannheim, Germany. (1998) Invited Lecture.

Building Scientific Visualization, Virtual Reality, CineGrid, Telepresence, and Collaboratories. For 50 years I have used visualization in computational science. At NCSA we set up a pioneering scientific visualization team. My partnership with the leaders of UIC’s Electronic Visualization Lab for 35 years has enabled us to build a sequence of world-leading capabilities in virtual reality, telepresence, and collaboratories, including the StarCAVE and VROOM at Calit2. We partnered with the cinema industry to create the CineGrid workshops which has had presentations on the leading-edge work on high resolution, globally streaming media.

1. “Supercomputers, Workstations, and Visualization," L. Smarr, in NCAR-41 Proceedings 1987, (Pechnomic Publishing Co., Inc.: Lancaster, PA) (1988).
2. “Visualization Captures the Imagination of Physicists,” L. Smarr, Computers in Physics 5, 564 (1991).
3. “Numerical Relativity: Black Hole Spacetimes," L. Smarr, D. Hobill, D. Bernstein, D. Cox, and R. Idaszak, SIGGRAPH Video Review: Visualization State of the Art, 49, (1989).
4. "Visualizing Black Hole Spacetimes," P. Anninos, M. Bajuk, D. Bernstein, D. Hobill, E. Seidel, and L. Smarr, IEEE Computer Graphics and Applications, 13, 12, (1993). *
5. “Teleimmersion and Visualization with the OptIPuter,” T. A. DeFanti, J. Leigh, M. D. Brown, D. J. Sandin, O.Yu, Chong Zhang, R. Singh, E. He, J. Alimohideen, N. K. Krishnaprasad, R. Grossman, M. Mazzucco, L. Smarr, M. Ellisman, P. Papadopoulos, A. Chien, J. Orcutt, in Telecommunication, Teleimmersion and Telexistence: Proceedings of the 12th International Conference on Artificial Reality and Telexistence, Susumu Tachi, editor, Ohmsha/IOS Press, 25-71 (2002). *
6. “International Real-Time Streaming of 4K Digital Cinema,” T. Shimizu, D. Shirai, H. Takahashi, T. Murooka, K. Obana, Y. Tonomura, T. Inoue, T. Yamaguchi, T. Fujii, N. Ohta, S. Ono, T. Aoyama, L. Herr, N. van Osdol, X. Wang, M. Brown, T. DeFanti, R. Feld, J. Balser, S. Morris, T. Henthorn, G. Dawe, P. Otto, L. Smarr, Future Generation Computer Systems, 22, 929-939 (2006) **
7. “CineGrid: a New Cyberinfrastructure for High Resolution Media Streaming,” L. Smarr, L. Herr, T. DeFanti, N. Ohta, P. Otto, [invited article] Cyberinfrastructure Tech. Watch Quart., v3,#2. (2007)
8. “The OptIPortal, a Scalable Visualization, Storage, and Computing Interface Device for the OptiPuter,” T. DeFanti, J. Leigh, L. Renambot, B. Jeong, A. Verlo, L. Long, M. Brown, D. Sandin, V. Vishwanath, Q. Liu, M. Katz, P. Papadopoulos, J. Keefe, G. Hidley, G. Dawe, I.Kaufman, B. Glogowski, K.-W. Doerr, R. Singh, J. Girado, J. Schulze, F. Kuester, L. Smarr, Future Generation Computer Systems, 25, 114-123 (2009). **

9. “OptIPlanet - the OptIPuter Global Collaboratory,” L. Smarr, M. Brown, C. de Laat, Future Generation Computer Systems, 25, 109-113 (2009) *
10. “The StarCAVE, a Third-Generation CAVE and Virtual Reality OptIPortal,” T. DeFanti, G. Dawe, D. Sandin, J. Schulze, P.Otto, J. Girado, F. Kuester, L. Smarr, R. Rao, Future Generation Computer Systems, 25, 169-178 (2009) **
11. “The Emergence of a Planetary-Scale Collaboratory for Data-Intensive Research,” L. Smarr [invited article] in Points of View-a Tribute to Alan Kay, I. Piumarta and K. Rose (eds.), Viewpoints Research Institute, 79-96. (2010)
12. “The Future of the CAVE,” T. A. DeFanti, D. Acevedo, R. A. Ainsworth, M. D. Brown, S. Cutchin, G. Dawe, K. Doerr, A. Johnson, C. Knox, R. Kooima, F. Kuester, J. Leigh, L. Long, P. Otto, V. Petrovic, K. Ponto, A. Prudhomme, R. Rao, L. Renambot, D. J. Sandin, J. P. Schulze, L. Smarr, M. Srinivasan, P. Weber, G. Wickham, Cent. Eur. J. Eng (2011) 1: 16. **

Developing a Distributed Machine Learning Cyberinfrastructure for Big Data Scientific Research. By 1988 the Internet had enabled building distributed “virtual” computers, by connecting different architectures of computers, large distributed data stores, visualization devices, and scientific instruments, forming what I termed “Metacomputers” or later “The Grid.” My 2002 OptIPuter NSF grant demonstrated that the wide-area bandwidth could be as fast as the backplane of a cluster, essentially eliminating distance for collaborative Big Data scientific research. This was followed by two NSF grants, Quartzite (2004) and Prism (2013), which demonstrated how to create high-speed “Big Data Freeways” on university campuses. The 2008 NSF GreenLight grant enabled us to research how such systems can be made more energy-efficient. In 2015, the NSF funded the Pacific Research Platform (PRP) grant to interconnect several dozen of these campus systems, built on four Regional Optical Networks (RONs: CENIC, PNWGP, FRGP, and MREN), enabling researchers to quickly move data between collaborators labs, supercomputer centers, instruments, and data repositories. The distributed PRP, driven by dozens of science and engineering applications, creates a metacomputer that allows the data to traverse multiple, heterogeneous networks with minimal performance degradation. Machine learning was added to the PRP in 2017 when NSF funded the Cognitive Hardware and Software Ecosystem Community Infrastructure (CHASE-CI) grant. In 2018, NSF funded Toward the National Research Platform (TNRP) to extend the PRP across the country by federating with four midwestern/eastern RONs and Internet2.

1. "Life After Internet: Making Room for Applications," L. Smarr and C. Catlett, in Building an Information Infrastructure, 1992, ed. B. Kahin, (McGraw-Hill: New York) (1991). *
2. “Metacomputing,” L. Smarr, C. E. Catlett, Comm. of the ACM, 35(6):44-52 (1992). **
3. “Building a Scalable America,” L. Smarr, Lecture Notes in Computer Science, 1082, 35-42 (1996)
4. “A Nationwide Parallel Computing Environment,” K. Kennedy, C. F. Bender, J. W. D. Connolly, J. L. Hennessy, M. K. Vernon, L. Smarr, CACM 40(11): 62-72 (1997). *
5. “Computational Infrastructure: Toward the 21st Century”, L. Smarr, CACM 40(11): 28-32 (1997) *
6. “Grids in Context”, L. Smarr, Chapter 1 in The Grid: A Blueprint for the New Computing Infrastructure edited by I. Foster and C. Kesselman (MKP) (1998) *
7. “Infrastructure for Science Portals,” IEEE Internet Computing, 4 (1) in “Millennial Forecasts” pp 47-77 [http://computer.org/internet/v4n1/smarr.htm] (2000). *
8. “Assembling the Planetary Computer,” Ubicomp 2001: Ubiquitous Computing pp 1-1 (2001)
9. “The OptIPuter,” L. Smarr, A. A. Chien, T. DeFanti, J. Leigh, P. M. Papadopoulos, Comm. of the ACM, 46, 58-67 (2003) **
10. “The Use of e-Science Grids to Support ORION,” L. Smarr. In International Science Planning Workshop on the Dynamics of Earth and Ocean Systems (DEOS): Ocean Research Interactive Observatory Networks (ORION), sponsored by the National Science Foundation (NSF) and the Natural Science and Engineering Research Council (Canada), January 4-8, 2004, Puerto Rico. www.optiputer.net/publications/articles/Smarr-OptIPuter-ORION.pdf
11. "A Management Concept for Ocean Observatories Based on Web Services," A. Chave, B. St. Arnaud, M. Abbott, J. Delaney, R. Johnson, E. Lazowska, A. Maffei, J. Orcutt, and L. Smarr. In Oceans '04, 2187-2193, 2004.

12. "An Integrated Approach to Ocean Observatory Data Acquisition/Management and Infrastructure Control using Web Services," B. St. Arnaud, A. Chave, A. Maffei, E. Laszowka, L. Smarr, G. Gopalan, Mar. Tech. Soc. J., 38, 155-163, (2004). *
13. "The Emerging Role of Biogrids," M. Ellisman, M. Brady, D. Hart, F.-P. Lin, M. Müller, L. Smarr, Comm. of the ACM, 47, 52-57 (2004). *
14. "The OptIPuter: a New Approach to Volume Visualization of Large Seismic Datasets," G. Kent, J. Orcutt, L. Smarr, J. Leigh, A. Nayak, D. Kilb, L. Renambot, S. Venkataraman, T. DeFanti, Y. Fialko, P. Papadopoulos, G. Hidley, D. Hutches, M. Brown, Ocean Technology Conference, May 2004.
15. "A Framework for Middleware Supporting Real-Time Wide-Area Distributed Computing," Kane Kim, Steve Jenks, L. Smarr, A. Chien, and L.-C. Zheng, Proceedings of 10th IEEE International Workshop on Object-Oriented Real-Time Dependable Systems (WORDS 2005), Sedona, AZ, February 2-4, 2005, pp. 231-240.
16. "Introduction--The Cyberinfrastructure Backplane: The Jump to Light Speed," L. Smarr and P. Papadopoulos, Guest Editors, Cyberinfrastructure Technology Watch Quarterly, 1, 2-4 (2005).
17. "The OptIPuter, Quartzite, and Starlight Projects: A Campus to Global-Scale Testbed for Optical Technologies Enabling LambdaGrid Computing" (invited paper), L. Smarr, J. Ford, P. Papadopoulos, S. Fainman, T. DeFanti, M. Brown, J. Leigh, Optical Fiber Communication Conference & Exposition and the National Fiber Optic Engineers Conference (OFC/NFOEC) 2005, Anaheim, California, March 6-11, 2005, CD ROM. *
18. "LOOKING: Cyberinfrastructure for Ocean Observatories" by A. D. Chave, M. Arrott, L. Smarr, J. A. Orcutt, E. Lazowska, J. R. Delaney, M. Abbott Proceedings of SSC'06- the Fourth International Workshop on Scientific Use of Submarine Cables and Related Technologies held in Dublin Castle, Ireland, (2006)
19. "iGrid 2005: The Global Lambda Integrated Facility," L. Smarr, T. A. DeFanti, M. D. Brown and C. de Laat, Future Generation Computer Systems, Vol. 22, pp. 849-851 (2006). *
20. "The OptIPuter: High-Performance, QoS-Guaranteed Network Service for Emerging e-Science Applications," N. Taesombut, F. Uyeda, A. A. Chien, L. Smarr, T. A. DeFanti, P. Papadopoulos, J. Leigh, M. Ellisman, J. Orcutt, IEEE Communications, 4, 38- 45 (2006) *
21. "The OptIPuter: A National and Global-Scale Cyberinfrastructure for Enabling LambdaGrid Computing," M. Brown, L. Smarr, T. DeFanti, J. Leigh, M. Ellisman, P. Papadopoulos, TeraGrid '06 Proceedings, Indianapolis, IN, June 12-15, (2006).
22. "Foreword", L. Smarr in Grid Networks: Enabling Grids with Advanced Communication Technology, eds. Franco Travostino, Joe Mambretti, Gigi Karmous-Edwards, pp. xxv - xxvi (John Wiley & Sons) (2006)
23. "Riding the Light Towards New Science," L. Smarr, [invited article] Nature Photonics, 1, 133-135 (2007)
24. "OptIPuter--A High Performance SOA LambdaGrid Enabling Scientific Applications," L. Smarr, Proceedings of the IEEE 11th Workshop on Future Trends of Distributed Computing Systems p. 3 (2007).
25. "Quartzite: A Campus-Scale Hybrid Networking Infrastructure," P. Papadopoulos, B. Dunne, L. Smarr, J. Ford, S. Fainman, Proceedings of the 2008 Conference on Optical Fiber Communication/National Fiber Optic Engineers Conference, San Diego, CA, 2008, pp. 1-3. (2008)
26. "Infrastructure for eScience and eLearning in Higher Education," E. Lazowka, P. Lee, C. Elliott, L. Smarr. Computing Community Consortium, 1-7 (2008) *
27. "The OptIPuter and Its Applications," [invited paper] Summer Topical Meeting, 2009 on Future Global Networks. LEOSST '09. IEEE Lasers and Electro-Optics Society (LEOS), pp 151-152 (2009)
28. "Campuses as Living Laboratories for the Greener Future," B. St. Arnaud, L. Smarr, J. Sheehan, and T. DeFanti, [invited article] EDUCAUSE Review, 44, 14-33 (2009) *
29. "Climate Change and Higher Education," B. St. Arnaud, L. Smarr, J. Sheehan, and T. DeFanti, EDUCAUSE Review, v.44, [invited paper] web supplement to journal article. (2009)
30. "Digital Infrastructure in a Carbon-Constrained World," L. Smarr, T. DeFanti, J. Sheehan, R. Tucker, B. St Arnaud. White paper presented at Australian-American West Coast Leadership Dialogue, 2009.01.15
31. "Project GreenLight: Optimizing Cyberinfrastructure for a Carbon-Constrained World," L. Smarr, [invited article] IEEE Computer, 43, 22-27 (2010) *
32. "The Growing Interdependence of the Internet and Climate Change," L. Smarr, [invited article] IEEE Internet Computing. January/February 2010, pp. 18-20

33. "Participatory sensing: applications and architecture [Internet Predictions]," D. Estrin, K. M. Chandy, R. M. Young, L. Smarr, A. Odlyzko, D. Clark, V. Reding, T. Ishida, S. Sharma, V. Cerf, U. Holzle, L. A. Barroso, G. Mulligan, A. Hooke, C. Elliott in IEEE Internet Computing, 14, 12-42 (2010). **
34. "Towards an integrated cyberinfrastructure for scalable data-driven monitoring, dynamic prediction and resilience of wildfires," I. Altintas, J. Block, R. de Callafon, D. Crawl, C. Cowart, A. Gupta, M. Nguyen, H.-W. Braun, J. Schulze, M. Gollner, A. Trouve, L. Smarr, Procedia Computer Science, vol. 51, pp 1633-1642 (2015) **
35. "The Pacific Research Platform: Making High-Speed Networking a Reality for the Scientist," L. Smarr, C. Crittenden, T. DeFanti, J. Graham, D. Mishin, R. Moore, P. Papadopoulos, F. Würthwein. In PEARC '18: Proceedings of the Practice and Experience on Advanced Research Computing, pp. 1-8. (2018) *
36. "Workflow-Driven Distributed Machine Learning in CHASE-CI: A Cognitive Hardware and Software Ecosystem Community Infrastructure," I. Altintas, K. Marcus, I. Nealey, S. Sellars, J. Graham, D. Mishin, J. Polizzi, D. Crawl, T. DeFanti, L. Smarr. In Proceedings of the IEEE International Symposium on Parallel and Distributed Processing Symposium Workshops (IPDPSW) (2019) *
37. "The Evolution of Bits and Bottlenecks in a Scientific Workflow Trying to Keep up With Technology: Accelerating 4D Image Segmentation Applied to NASA data," S. Sellars, J. Graham, D. Mishin, K. Marcus, I. Altintas, T. DeFanti, L. Smarr, C. Crittenden, F. Wuerthwein, J. Tatar, P. Nguyen, E. Shearer, S. Sorooshian, M. Ralph, in Proceedings of the 15th IEEE International eScience Conference (2019)
38. "Towards a Dynamic Composability Approach for using Heterogeneous Systems in Remote Sensing," I. Altintas, I. Perez, D. Mishin, A. Trouillaud, C. Irving, J. Graham, M. Tatineni, T. DeFanti, S. Strande, L. Smarr, M. L. Norman, e-Science 2022: 336-345 (2022)

Investigating Microbial Communities. I was fortunate to have Carl Woese, the Father of the microbial Tree of Life, as a mentor on microbes at UIUC in the 1990s. In 2005, the Gordon and Betty Moore Foundation funded me to create a Calit2 computational and storage Community Cyberinfrastructure for Advanced Microbial Ecology Research and Analysis (CAMERA) to become a global repository for microbiome ecology datasets. Then in 2014, I helped recruit Rob Knight to UCSD and have been a close collaborator of his since. With his Center for Microbiome Innovation's extraordinarily talented team, as well as other UCSD collaborators, I have helped investigate many frontier areas of the exploding field of microbiomes and how they interact with their hosts or environments.

1. "The Ocean of Life: Creating a Community Cyberinfrastructure for Advanced Marine Microbial Ecology Research and Analysis (a.k.a. CAMERA)," L. Smarr, Strategic News Service® Invited Special Letter, March 21st (2006)
2. "A Community Resource for Metagenomics: CAMERA," R. Seshadri, S.A. Kravitz, L. Smarr, P. Gilna, M. Frazier, PLoS Biol 5(3): e75 (2007) **
3. "Building an OptIPlanet Collaboratory to Support Microbial Metagenomics," L. Smarr, P. Gilna, P. Papadopoulos, T. DeFanti, G. Hidley, J. Wooley, E. V. Armbrust, F. Rohwer, E. Frost, Future Generation Computer Systems, 25, 124-131 (2009).
4. "Using pairwise difference features to measure temporal changes in the microbial ecology," M. Yazdani and L. Smarr, 2015 IEEE International Conference on Big Data, 2925-2927 (2015).
5. "Using Machine Learning to Identify Major Shifts in Human Gut Microbiome Protein Family Abundance in Disease," M. Yazdani, B. C. Taylor, J. W Debelius, W. Li, R. Knight, and L. Smarr, Proceedings of the 2016 IEEE International Conference on Big Data. 1272-1280 (2016) *
6. "Bringing the Dynamic Microbiome to Life with Animations," Y. Vazquez-Baeza, A. Gonzalez, L. Smarr, D. McDonald, J. T. Morton, J. A. Navas-Molina, and R. Knight. Cell Host and Microbe, vol. 21, pp 7-10 (2017) **
7. "Are microbiome studies ready for hypothesis-driven research?" A. Tripathi, C. Marotz, A. Gonzalez, Y. Vázquez-Baeza, S. J. Song, A. Bouslimani, D. McDonald, Q. Zhu, J. G. Sanders, L. Smarr, P. C. Dorrestein, R. Knight, Current Opinion Microbiology 44, 61-69 (2018). *
8. "American Gut: an Open Platform for Citizen Science," D. McDonald, E. Hyde, J. W. Debelius, J. T. Morton, A. Gonzalez, G. Ackermann, A. A. Aksenov, B. Behsaz, C. Brennan, Y. Chen, L. DeRight Golda, P. C. Dorrestein, R. R. Dunn, A. Fahimipour, J. Gaffney, J. A. Gilbert, G. Gogul, J. L. Green, P. Hugenholtz, G. Humphrey, C. Huttenhower, M. A. Jackson, S. Janssen, D. V. Jeste, L. Jiang, S. T. Kelley, D. Knights, T. Kosciolek, J. Ladau, J. Leach, C. Marotz, D. Meleshk, A. V. Melnik, J. L. Metcalf, H. Mohimani, E. Montassier, J. Navas-Molina, T. T. Nguyen, S. Peddada, P. Pevzner, K. S. Pollard, G.

Rahnavard, A. Robbins-Pianka, N. Sangwan, J. Shorenstein, L. Smarr, S. J. Song, T. Spector, A. D. Swafford, V. G. Thackray, L. R. Thompson, A. Tripathi, Y. Vázquez-Baeza, A. Vrbanac, P. Wischmeyer, E. Wolfe, Q. Zhu, The American Gut Consortium, Rob Knight. mSystems 3:e00031-18. (2018). **

9. "Creating a 3D microbial and chemical snapshot of a human habitat," C. A. Kapono, J. T. Morton, A. Bouslimani, A. V. Melnik, K. Orlinsky, T. Luzzatto Knaan, N. Garg, Y. Vázquez-Baeza, Iv. Protsyuk, S. Janssen, Q. Zhu, T. Alexandrov, L. Smarr, R. Knight, P. C. Dorrestein. Altmetric: Nature Scientific Reports, vol.8: 3669 (2018) *
10. "Escherichia coli B2 Strains Prevalent in Inflammatory Bowel Disease Patients Have Distinct Metabolic Capabilities that Enable Colonization of Intestinal Mucosa," X. Fang, J. M. Monk, N. Mih, B. Du, A. Sastry, E. Kavvas, Y. Seif, L. Smarr, B. O. Palsson. BMC Systems Biology, 12, 66 (2018). *
11. "De Novo Peptide Sequencing Reveals a Vast Cyclopeptidome in Human Gut and Other Environments," B. Behsaz, . Mohimani, A. Gurevich, A. Prjibelski, M. F. Fisher, L. Smarr, P. C. Dorrestein, J. S. Mylne, and P. A. Pevzner. Cell Systems 40 (2019) *
12. "Optimizing sequencing protocols for leaderboard metagenomics by combining long and short reads," J. G. Sanders, S. Nurk, R. A. Salido, J. Minich, Z. Z. Xu, Q. Zhu, C. Martino, M. Fedarko, T. D. Arthur, F. Chen, B. S. Boland, G. C. Humphrey, C. Brennan, K. Sanders, J. Gaffney, K. Jepsen, M. Khosroheidari, C. Green, M. Liyanage, J. W. Dang, V. V. Phelan, R. A. Quinn, A. Bankevich, J. T. Chang, T. M. Rana, D. J. Conrad, W. J. Sandborn, L. Smarr, P. C. Dorrestein, P. A. Pevzner. Genome Biol 20, 226 (2019) *
13. "Phylogenomics of 10,575 Genomes Reveals Evolutionary Proximity Between Domains Bacteria and Archaea," Q. Zhu, U. Mai, W. Pfeiffer, S. Janssen, F. Asnicar, J. G. Sanders, P. Belda-Ferre, G. A. Al-Ghalith, E. Kopylova, D. McDonald, T. Kosciolek, J. B. Yin, S. Huang, N. Salam, J.-Y. Jiao, Z. Wu, Z. Z. Xu, K. Cantrell, Y. Yang, Erfan Sayyari, M. Rabiee, J. T. Morton, S. Podell, D. Knights, W.-J. Li, C. Huttenhower, N. Segata, L. Smarr, S. Mirarab, R. Knight. Nature Communications 10, 5477 (2019) **
14. "Microbiome 101: Studying, Analyzing, and Interpreting Gut Microbiome Data for Clinicians," C. Allaband, D. McDonald, Y. Vázquez-Baeza, J. J. Minich, A. Tripathi, D. Brenner, R. Loomba, L. Smarr, W. J. Sandborn, B. Schnabl, P. Dorrestein, A. Zarrinpar, R. Knight. Clinical Gastroenterology and Hepatology 17, 218-230 (2019). **
15. "Gastrointestinal Surgery for Inflammatory Bowel Disease Persistently Lowers Microbiome and Metabolome Diversity," X. Fang, Y. Vázquez-Baeza, E. Elijah, F. Vargas, G. Ackermann, G. Humphrey, R. Lau, K. C. Weldon, J. G. Sanders, M. Panitchpakdi, C. Carpenter, A. K. Jarmusch, J. Neill, A. Miralles, P. Dulai, S. Singh, M. Tsai, A. D. Swafford, L. Smarr, D. L. Boyle, B. O. Palsson, J. T. Chang, P. C. Dorrestein, W. J. Sandborn, R. Knight, B. S. Boland, Inflammatory Bowel Diseases, 27, 603–616 (2021). *

Quantifying My Body in Health and Disease. One of the Calit2's original interdisciplinary themes in 2000 was "Digitally Enabled Genomic Medicine," which envisioned a future in which both the human genomics and wireless sensor "read out" of individuals would be routine, as they have come to be 20 years later. I decided that to better understand these evolving trends I should try to live as a Future Patient in what Lee Hood has termed Predictive, Preventive, Personalized and Participatory (P4) Medicine. I had my full human genome sequenced and became actively involved with quantifying the state of my body, creating multi-year time-series of over 150 biomarkers from my blood and stool, with the later revealing the dynamics of gut microbiome genomics. In addition, I became an early member of Harvard's Personal Genome Project led by George Church and of Lee Hood's Pioneer 100 Wellness Project. By 2011, using these time series, I discovered that I was chronically inflamed, caused by an autoimmune disease [inflammatory bowel disease (IBD)-colonic Crohn's disease] that both my doctors and I were unaware I had. The progression of the disease caused massive dysbiosis in my gut microbiome and eventually a stricture in my sigmoid colon. My team has worked for several years with Rob Knight's team to analyze my gut microbiome time-series, while I developed close collaborations with UCSD doctors in surgery, radiology, gastroenterology, and other specialties. My Calit2@UCSD software development team has developed interactive visualization tools and environments for analyzing large amounts of human-generated biomedical data, including most recently 3D visualizations of individual patients derived from MRI/CAT scans to personalize pre-planning of robotically-assisted surgery, which I was able to help prototype with a sigmoid resection in November 2016.

1. "Mednet: A Model For Applying Supercomputing Technologies To Medical Biostereometrics," F. A. Wrestler, W. Airth-Kindree, D. P. Lawrance, L. L. Smarr, R. Herron, Proc. SPIE 1030, Biostereometrics' '88, 245-249 (1989)

2. "How I Improved My Health by Changing My Eating, Exercise, and Stress Management Habits: An Annotated Reading List," 2011.6.11 invited article by Mark Anderson, CEO Strategic News Service, for distribution to the Future in Review 2011 attendees.
3. "Quantified Health: A 10-year Detective Story of Digitally Enabled Genomic Medicine," 2011.9.26 Larry Smarr, with commentary by Mark Anderson, published as a Special Letter in the Strategic News Service Newsletter. http://lsmarr.calit2.net/repository/092811_Special_Letter,_Smarr.final.pdf
4. "Quantifying Your Body: A How-to Guide from A Systems Biology Perspective," L. Smarr, [invited article] Biotechnology Journal, 7, 980–991 (2012). **
5. "Large Memory High Performance Computing Enables Comparison Across Human Gut Microbiome of Patients with Autoimmune Diseases and Healthy Subjects," S. Wu, W. Li, L. Smarr, K. Nelson, S. Yooseph, M. Torralba, ACM XSEDE '13 Proceedings of the Conference on Extreme Science and Engineering Discovery Environment: Gateway to Discovery Article #5 (2013). *
6. "Toward more transparent and reproducible omics studies through a common metadata checklist and data publications," E. Kolker, V. Özdemir, L. Martens, W. Hancock, G. Anderson, N. Anderson, S. Aynacioglu, A. Baranova, S. R. Campagna, R. Chen, J. Choiniere, S. P. Dearth, W.-C. Feng, L. Ferguson, G. Fox, D. Frishman, R. Grossman, A. Heath, R. Higdon, M. H Hutz, I. Janko, L. Jiang, S. Joshi, A. Kel, J. W. Kemnitz, I. S. Kohane, N. Kolker, D. Lancet, E. Lee, W. Li, A. Lisitsa, A. Llerena, C. MacNealy-Koch, J.-C. Marshall, P. Masuzzo, A. May, G. Mias, M. Monroe, E. Montague, S. Mooney, A. Nesvizhskii, S. Noronha, G. Omenn, H. Rajasimha, P. Ramamoorthy, J. Sheehan, L. Smarr, C. V. Smith, T. Smith, M. Snyder, S. Rapole, S. Srivastava, L. Stanberry, E. Stewart, S. Toppo, P.Uetz, K. Verheggen, B. H. Voy, L. Warnich, S. W. Wilhelm, G. Yandl, Omics, Vol 18, pp 10-14 (2014). **
7. "Using Machine Learning to Identify Major Shifts in Human Gut Microbiome Protein Family Abundance in Disease," M. Yazdani, B. C. Taylor, J. W Debelius, W. Li, R. Knight, and L. Smarr, Proceedings of the 2016 IEEE International Conference on Big Data." (2016)
8. "Using Topological Data Analysis to find discrimination between microbial states in human microbiome data," M. Yazdani, L. Smarr, R. Knight, Proceedings of the Workshop on CompBio at the International Conference on Machine Learning (ICML2016) (Poster)
9. "Tracking Human Gut Microbiome Changes Resulting from a Colonoscopy," L. Smarr, E. R. Hyde, D. McDonald, W. J. Sandborn, R. Knight. Methods of Information in Medicine. 56(6):442-447 (2017)
10. "Metagenomics-Based, Strain-Level Analysis of Escherichia coli From a Time-Series of Microbiome Samples From a Crohn's Disease Patient," X. Fang, J. M. Monk, S. Nurk, M. Akseshina, Q. Zhu, C. Gemmell, C. Gianetto-Hill, N. Leung, R. Szubin, J. Sanders, P. L. Beck, W. Li, W. J. Sandborn, S. D. Gray-Owen, R. Knight, E. Allen-Vercoe, B. O. Palsson, L. Smarr. Frontiers in Microbiology. Vol 9, article 2559 (2018)
11. "Future Patient: Larry Smarr at the Visualization Wall at Calit2," UCTV video 2018.06.08
12. "Evaluating Metagenomic Prediction of the Metaproteome in a 4.5-Year Study of a Patient with Crohn's Disease," R. H. Mills, Y. Vázquez-Baeza, Q. Zhu, L. Jiang, J. Gaffney, G. Humphrey, L. Smarr, R. Knight, D. J. Gonzalez. mSystems 4:e00337-18 (2019) *
13. "Longitudinal flux balance analyses of a patient with episodic colonic inflammation reveals microbiome metabolic dynamics," A. Basilea,b, A. Heinkenb, J. Herteld, L. Smarr, Weizhong Li, L. Treua, G. Vallea, S. Campanaroa, and I. Thiele, Gut Microbes, 15, 1-25 (2023)

Government Reports

1. Report of the NSF Subcommittee on Computational Facilities for Theoretical Research to the Advisory Committee for Physics (1981) Prepared by Members of the Subcommittee [the "Press Report" Led to the Series of NSF Panels on High Performance Computing]
2. "Some Examples of Supercomputing Projects," in The Report of the Panel on Large Scale Computing in Science and Engineering, P. D. Lax, Chairman, (1982).
3. "The Supercomputer Famine in American Universities," in The Report of the Panel on Large Scale Computing in Science and Engineering, P. D. Lax, Chairman, (1982).
4. Invited testimony appeared in the Congressional Record of the Joint Session of the U.S. House Committee on Science and Technology, Committees on Science, Research, and Technology and on Energy Development and Applications, June 10, 1985.

5. "Report of the Panel on Science and Technology Centers," Prepared by Members of the Panel on Science and Technology Centers, National Academy of Sciences (1987).
6. Invited testimony appeared in the Congressional Record of the U. S. House of Representatives Committee on Science, Space, and Technology's Subcommittee on Science, Research, and Technology, March 24, 1988.
7. "Introduction," L. Smarr, in Supercomputers: Directions in Technology and Applications, 13-17, National Research Council (National Academy Press: Washington D.C.) (1989).
8. Science and Technology in the Academic Enterprise: Status, Trends and Issues, Prepared by Members of the Government-University-Industry Research Roundtable, National Academy of Sciences (1989) [http://books.nap.edu/books/0309041759/html/R1.html#pagetop]
9. "What is happening on the Hill?" (panel session) Donna J. Cox, Larry Smarr, Jacob V. Maizel, Rich Hirsh, at International Conference on Computer Graphics and Interactive Techniques archive ACM SIGGRAPH 90 Panel Proceedings, pp 1201-1215 (1990).
10. "White Paper of the Computing and Data Processing Panel," L. Smarr, chair, in Working Papers: Astronomy and Astrophysics Panel Reports, Astronomy and Astrophysics Survey Committee, National Research Council (National Academy Press: Washington D.C.) (1991)
11. "Evolving the High Performance Computing and Communications Initiative to Support the Nation's Information Infrastructure by Members of the Committee to Study High Performance Computing and Communications: Status of a Major Initiative," Computer Science and Telecommunications Board, National Research Council (1995) ("Brooks-Sutherland Report").
12. Report on the Biomedical Information Science and Technology Initiative Prepared by the Working Group on Biomedical Computing, Advisory Committee to the Director, National Institutes of Health, June 3,1999 (Co-Chairs, Larry Smarr and D. Botstein) [www.nih.gov/welcome/director/060399.html] (1999)
13. "Information Technology Research: Investing in Our Future," a Report to the President of the United States by the Members of the President's Information Technology Advisory Committee, Feb. 24, 1999 [www.ccic.gov/ac/report/] (1999).
14. "Open Source Software for High End Computing," L. Smarr and S. Graham (co-chairs), President's Information Technology Advisory Committee (PITAC). (2000).
15. Report on NSF ANIR Experimental Infostructure Networks, by Larry Smarr, George Clapp, Thomas DeFanti, and Maxine Brown. The workshop, sponsored by the National Science Foundation, Directorate for Computer and Information Science and Engineering, Advanced Networking Infrastructure & Research Division, which led to the report was hosted by the Calit2@UC Irvine, May 20-21, 2002. Report submitted November 5, 2002
16. "Australia Moving Toward the Information Age Economy," Invited after dinner speech by L. Smarr. Speech Delivered to the Australian American Leadership Dialogue Gala Dinner August 15, 2009 Melbourne, Australia.
17. "Reflections on the NSF Supercomputer Center Program: The Good, The Bad, and The Ugly," L. Smarr, [invited paper] accepted by the NSF Community Input on the Future of High-Performance Computing Workshop (www.nics.tennessee.edu/workshop) held at the National Institute for Computational Science (NICS) at the University of Tennessee on December 4, 2009

Other Works, Popular Articles, Interviews, and Profiles

Public Articles/Videos/Podcasts [For a complete set of my public presentations (videos and slides) see http://lsmarr.calit2.net.]

1. "Our Elastic Spacetime: Black Holes and Gravitational Waves," L. Smarr and W. H. Press American Scientist, 66, 72-79 (1978).
2. "Einstein's Impact on the Contemporary World," available from Resident Associate Program, Smithsonian Institution, Washington, D.C., (1979).
3. "Black Holes," L. Smarr, in Academic American Encyclopedia (Arete, 1979).

4. "Earthport," Future Life, 12, 50-52 (1979).
5. "Earthport - An International Space Launch Site," Space Age Rev., Mar.-Apr. (1979).
6. "Gravity, Black Holes, and the Universe," by Ian Nicolson, book reviewed by L. Smarr in Physics Today, 35, 78-79 (1982).
7. "Black Hole Accretion: The Quasar Powerhouse," Energy & Tech. Rev., March 1983, with J. Hawley. (1983)
8. "Grand Challenges of Computational Science (panel session)," Larry Smarr, Gregory J. McRae, David Dixon, Eric S. Lander: SIGGRAPH (Panels) 101-127 (1990).
9. "How Supercomputers are Transforming Science," in Encyclopedia Britannica Yearbook (1991).
10. "The Emergence of Grid Information Infrastructures" L. Smarr, in AAAS Science and Technology Yearbook 2000, Chapter 23, eds. Albert H. Teich, Stephen D. Nelson, Ceilia McEnaney, Stephen J. Lita (2000).
11. "An Intelligent Infrastructure Initiative for Australian Society and Homeland Security," L. Smarr. White paper presented during my 2008 Leadership Dialogue Scholar speaking tour. 2008.10.20
12. "Greening the Internet in a Carbon-Constrained World," L. Smarr, [invited article] OpEd piece appeared in Xconomy.com 2009.02.02
13. "Visualizing Science: The OptIPuter Project," Spring 2009 SciDAC Review, Issue 12, IOP Publishing in association with Argonne National Laboratory, for the US Department of Energy, Office of Science, pp. 32-41
14. L. Smarr, UCSD 2009 Welcome Week Convocation Keynote Speech, 2009.09.22
15. "The Good, the Bad, and the Ugly: Reflections on the NSF Supercomputer Center Program," L. Smarr 2010.01.04
16. "Larry Smarr Sizzle of Science" 2010.09.21 video for NSF's Facebook page.
17. "Founding NCSA director Larry Smarr reminisces," 2011.03.02 live video feed to NCSA's 25th anniversary celebration in Champaign-Urbana, IL.
18. "Quantified Health: A 10-year Detective Story of Digitally Enabled Genomic Medicine," 2011.09.26 Larry Smarr, with commentary by Mark Anderson, published as a Special Letter in the Strategic News Service Newsletter.
19. "An Evolution Toward a Programmable Universe," 2011.12.5 Invited Essay, the New York Times.
20. "You are a Superorganism," 2013.01.20 TEDemergencexYouth
21. "Can you coordinate the dance of your body's 100 trillion microorganisms?" TEDMED 2013.5.22
22. "The Man Who Saw Inside Himself," Aspen Ideas Festival 2018.07.09

Media Coverage

1. "Larry Smarr on the Phil Donahue Show," 1983.01.01(video)
2. "Larry Smarr on World Net News," 1987.04.01 (video)
3. "Larry Smarr on CBS Nightwatch," Interview by Charlie Rose 1988.04.20 (video)
4. "Supercomputer Pictures Solve the Once Insoluble," by John Markoff, New York Times 1988.10.30
5. Subject of "The New Language of Science," Bill Kurtis video production for the PBS series New Explorers and L. Smarr in New Explorers, (Weldon Owen Publishing, Sydney, Australia) (1992) (video)
6. "A Crucial Linkup in the U.S. Data Highway," by John Markoff, New York Times 1992.09.30
7. "Doing Science on the Network: A Long Way From Gutenberg," by William Broad, New York Times 1993.05.18
8. "A Free and Simple Computer Link," by John Markoff, New York Times 1993.12.08
9. "Report Backs U.S. Program For Computer Development," by John Markoff, New York Times 1995.03.03
10. "HPC in 1996 and 1997—An Interview with Larry Smarr," Interview by Alan Beck, Editor-in-Chief HPCwire 1997.01.10.
11. "U.S. To Support Fewer Supercomputer Centers," by John Markoff, New York Times, 1997.03.31
12. "Beyond 'Big Iron' in Supercomputing," by James Glanz, Science 1998.03.27
13. "Keeps the Peace Between Government, Academia and Industry," Red Herring Magazine, 1998.11

14. Extensive Quotes in “Impacts: Computing 2010: From Black Holes to Biology” Special Millennium Supplement to Nature 402, C67 (1999)
15. “Alliance and NCSA Announce Leadership Transition,” HPCWire 2000.03.03
16. “Larry Smarr To Direct Cal-(IT)2,” HPCWire. 2000.12.08
17. “The Soul of the Ultimate Machine,” by John Markoff, New York Times 2000.12.10
18. “Smarr Predicts the Self-Aware Web,” HPCWire 2000.12.15
19. Interview with others "Dialing into the Long View," in The T-Sector, Issue 8 pps 48-58 (2002).
20. "Planet Internet," Interview in Technology Review, 2002.03
21. “National Science Foundation Announces Grant Winners,” by John Markoff, New York Times, 2002.09.26
22. “Supercomputer To Utilize Optical Fibers,” by John Markoff, New York Times, 2002.11.18
23. "Larry Smarr on the Shape of the Grid in 2003," Interview by Alan Beck, Editor-in-Chief GridToday 2002.12.16: Vol. 1 #. 27.
24. “Ahead of the Pack,” Mizzou magazine, Summer 2003.
25. "Add Another Zero: An Interview with Larry Smarr," Interview in Educause Review Nov/Dec 2003.
26. “Larry Smarr, Internet’s grandfather, looking for an encore,” GigaOM 2003.11.19
27. "Interview with Larry Smarr, Cal-(IT)2," Interview by Tim Curns, Assistant Editor, HPCwire 2003.11.28: Vol. 12, No. 47.
28. "Five Questions: Larry Smarr," Interview, San Diego Union-Tribune, 2003.12.16
29. “From the Chancellor’s Desk: Q&A with Larry Smarr, Director Calit2,” UC San Diego 2005.05.23
30. "Larry Smarr on Future of Grid, Cyberinfrastructure," Interview by Derrick Harris, Editor GridToday 2005.05.23
31. “The list: R&D projects that Must Get Done,” EE Times 2005.08.08
32. “Researchers Look to Create a Synthesis of Art and Science for the 21st Century,” by John Markoff, New York Times, 2005.09.05
33. “Eye-Popping Streaming Film Debuts,” by Xeni Jardin, Wired 2005.09.30
34. “The Time is Now: Bust Up the Box!” by John Markoff, New York Times, 2005.10.05
35. “The OptIPuter Gets Real,” by Michael Feldman, HPCWire, 2006.01.27
36. “The 10 Coolest Technologies You've Never Heard Of--#3 Unreal Telepresence,” PCMag.com 2006.07.12
37. “The OptIPuter: An Information Superhighway for Terabytes,” by Patricia Daukantas, Optics and Photonics News 2006.09
38. “UCSD, Venter Institute Launch Metagenomics Complex,” by Nicole Hemsoth. HPCWire 2007.03.16
39. “Broadband vision needed for Australia: expert warns,” by Peter Ryan, The World Today: Australian Broadcasting Company 2007.06.12
40. “Australia Must Keep Up: IT Guru,” article by B. Nicholson on LS keynote address at the Australian American Leadership Dialogue in Melbourne, Australia, The Age 2007.08.20
41. “Optical Network Is Key to Next-Generation Research Cyberinfrastructure,” by Tiffany Trader HPCWire 2008.06.11
42. “How Internet Pioneer Larry Smarr Lost 20 Pounds by Becoming a “Quantified Self,” by Luke Timmerman, Xconomy 2010.05.12
43. “Calit2’s Larry Smarr (Part I) on the Origins of the Internet, Innovations in IT, and Insights on the Path Ahead,” [Xconomy profile by Bruce Bigelow 2010.09.30, resulting from extensive interviews with LS]
44. “Calit2’s Larry Smarr (Part 2): Insights on the Path Ahead and 4 Big Ideas for the Future of Health, Energy, Environment, and Culture,” [Xconomy profile of LS by Bruce Bigelow 2009.10.01, resulting from extensive interviews with LS]
45. “Gordon Puts Flash into Data Intensive Supercomputing,” by Kevin Davies, Bio-IT World 2011.08.02
46. “The Atlantic Meets the Pacific: Exploring Technology with Peggy Johnson and Larry Smarr,” interview by James Fallows. 2011.10.18

47. "Xconomist of the Week: Larry Smarr's 10-Year Quest for 'Quantified Health'," 2011.11.22 Interview by Bruce Bigelow, Xconomy San Diego.
48. "Body of work could lead to health care breakthrough," by Neil Senturia and Barbara Bry, San Diego Union-Tribune 2011.11.29
49. "The Patient of the Future," by Jon Cohen, MIT Technology Review 2012.02.21
50. "(Data driven life)^10 featuring Larry Smarr @lsmarr," by Jonathan Eisen, Tree of Life blog 2012.02.23
51. "Calit2 Director Sees Healthcare on Cusp of Breakthrough," California Council on Science and Technology Spotlight, 2012.03.01
52. "How Larry Smarr's data obsession changed his health," MIT Technology Review 2012.03.01
53. "Innovator tracks everything his body does," by Gary Robbins, U-T San Diego 2012.03.03
54. "Learning to think," 2012.03.16 An autobiographical video including comments on the role of science as it relates to the general public. Video by Gary Robbins and David Brooks, San Diego Union-Tribune.
55. "Quantified Self" 2012.03.16 Video of me explaining Quantified Self and how I believe it could help lower the financial strains of health care. Video by Gary Robbins and David Brooks, San Diego Union-Tribune.
56. "Computer Scientist Uses Game Consoles to Power 3D MRI of His Diseased Colon, Hopes to Revolutionize Healthcare," Kent Szlauderbach, Kill Screen. 2012.06.21
57. "100 Petabytes of Data in Poop?," by Paul Barsch, Smart Data Collective 2012.06.26.
58. Podcast Radio New Zealand. 2012.07.21 Interview on This Way Up, Radio New Zealand.
59. "Is health tracking the next big thing?," Orange County Register 2012.08.12.
60. "The Measured Man," by Mark Bowden, Atlantic Magazine July/August 2012
61. "Tracking your body with technology," by Elizabeth Landau, CNN Health 2012.09.22
62. "The Human Laboratory: One Researcher's Quest to Personalize Medicine," Interview by the Atlantic Magazine's Mark Bowden, Atlantic Meets Pacific 2012, UC San Diego. 2012.11.26
63. "One Cloud to Rule Them All," by Tiffany Trader, HPCWire 2012.12.06
64. "Larry Smarr: Where There Is Data There Is Hope," by Ernesto Ramirez, Quantified Self 2013.02.12
65. "A 'Big Data' Freeway for Scientists," by John Markoff, New York Times, 2013.03.20
66. "Larry Smarr: Building Mosaic," by Charles Severance, Computer 2013.04
67. "N=Me," by Kerry Grens, The Scientist 2013.08.01
68. "Monitor Me," by Kevin Fong, BBC Documentary 2013.8.12. [Profiles me as well as other quantified selves]
69. "Gut Instinct," by Jon Cohen, Science 2013.10.04.
70. "Gut-Level App," by Dale Smith, Mizzou magazine 2013.11.13
71. "Founding NCSA Director Receives Golden Goose Award," HPCWire 2014.02.18
72. "Through the Looking Glass: Larry Smarr on Emerging Supercomputing Technologies," by Nicole Hemsoth, HPCWire Podcast 2014.02.21
73. "The Quantified Computer Scientist: Larry Smarr on the Future of Medicine," by James Temple, <re/code> 2014.03.08
74. "From Quantified Self to Personalized Medicine," by Tiffany Trader, HPCWire 2014.11.06
75. The Excrement Experiment, New Yorker, 2014.12.01
76. "The Human Upgrade: The Revolution Will Be Digitized," by Ariana Eunjung Cha, Washington Post 2015.05.09
77. "Health and data: can digital fitness monitors revolutionise our lives?," The Guardian 2015.05.19
78. "Research Scientists to Use Network Much Faster Than Internet," by John Markoff, New York Times 2015.07.31
79. "NSF Gives Green Light to Pacific Research Platform," HPCWire 2015.08.04
80. "Larry Smarr on Solving the Big Data Challenge in HPC," by Alison Diana, HPCWire 2015.09.25
81. "Larry Smarr: Building the Big Data Superhighway," by Alison Diana, EnterpriseTech 2015.09.25
82. "Gravitational Waves Detected! Historic LIGO Success Strikes Chord with Larry Smarr," by John Russell, HPCwire 2016.02.12

83. "Gravitational Waves Detected 100 Years After Einstein's Prediction", in HPC Wire, 2016.02.12
84. "Scientists Detect Collision of Two Black Holes," UC San Diego's Qualcomm Institute News 2016.02.12
85. "Larry Smarr Helps NCSA Celebrate 30th Anniversary," by John Russell, HPCWire 2016.09.02
86. "Look Twice, Cut Once," by Scott LaFee, UC San Diego Health News 2017.02.24
87. "Visualizing the Future of Surgery." by Scott LaFee, UC San Diego News Center 2017.03.09
88. "Crohn's Disease Patient Invites the Public to Look Inside His Virtual Colon, Shows 3D Model to Surgeon Before Procedure." by Clare Scott, 3DPrint.com. 2017.03.10
89. "The Quantified Patient Checks In: Larry Smarr's Experiments in Self-Tracking for Health." by Sarah Campbell, IEEE Pulse. 2017.07.13
90. "NSF Project Sets Up First Machine Learning Cyberinfrastructure – CHASE-CI." by John Russell, HPCwire. 2017.07.25
91. "This UC San Diego Professor Planned His Surgery In Virtual Reality." by David Wagner, KPBS. 2017.03.09
92. "Welcome to my colon: A tech pioneer turns to virtual reality to guide his own surgery," by Usha Lee, STAT McFarling, 2017.03.09
93. "Larry Smarr Drives Innovation as Experimental Patient of the Future," by Bruce Bigelow, Xconomy 2017.03.09
94. "CSE Professor, Lecturer Team with UC San Diego Health to Bring 3D Visualization to Abdominal Surgery," UCSD CSE web site article. 2017.03.09
95. "Internet pioneer seeks another revolution: 3D imaging for colon surgeries," by Paul Sisson, San Diego Union Tribune. 2017.03.09
96. "Larry Smarr Talks Machine Intelligence at Jackson State," HPCWire 2017.04.13
97. "NSF Project Sets Up First Machine Learning Cyberinfrastructure – CHASE-CI," by John Russell HPCWire 2017.07.25
98. "Why Larry Smarr Is Pioneering Collaborative Innovation." by Lawrence M. Fisher, Strategy+Business. 2017.10.09
99. "Will The Next Generation of Computers Celebrate Humanity or Strip It Away?" by Bruce Kasanoff, Forbes. 2018.10.15
100. "The Man Who Saw Inside Himself." by Mark Bowden, The Atlantic March 2018. 2018.03.15
101. "The Researcher Who Planned His Own Surgery in Virtual Reality," by Brent Crane, Folks. 2018.4.20
102. "Secretive startup Pattern Computer emerges from stealth, promising a 'revolution in computing'." by Nat Levy, Geekwire.com. 2018.05.23
103. "Machine Learning Illuminates the Body's Dark Matter." by Shelby Pope, Medium. 2018.05.24
104. "Future Patient/Future Doctor - Larry Smarr, PhD and Michael Kurisu, DO," UCTV 2018.06.08 (video)
105. "Will Supercomputers Create Virtual Maps of Your Body in the Future?," Seeker 2018.08.06 (video)
106. "Helmsley Charitable Trust Grants UC San Diego $4.7M to Study Crohn's Disease," by Debbie L. Sklar, Times of San Diego 2019.05.11
107. "Larry Smarr: The World's Most Self-Measured Man," by Donna Chisholm, New Zealand Listener. 2019.06.19
108. "Firefighters Look to Supercomputers to Combat Wildfires," by Itay Hod, Spectrum News 1. 2019.07.23
109. "Kazuhm Welcomes Distributed Computing Pioneer Dr. Larry Smarr as Technology Evangelist," HPCWire 2020.08.19
110. "Larry Smarr: The Future of Distributed Computing Is Here," by Alex Woodie HPCWire 2020.08.25
111. "Pioneering Scientist and Innovator Larry Smarr Retires," HPCWire 2020.06.13
112. "Looking Back with Larry," by Xochitl Rojas-Rocha, Triton 2020.09.30
113. "How To Find A Cure," The Explainable Startup (Blog) by Peter Sweeney 2020.09
114. "ENIAC at 75: Celebrating the World's First Supercomputer," by Todd R. Weiss, HPCWire 2021.02.15

115. "SC21: Larry Smarr on The Rise of Supernetwork Data Intensive Computing," by John Russell, HPCWire 2021.11.26
116. "From Coffee Cart to Educational Computing Platform," by Daniel Kane, UC San Diego Today 2022.1.20
117. "Celebrating Larry Smarr," by Mika Elizabeth Ono 2023.2.27