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**CURRICULUM VITAE**

Notre Dame, Indiana  
June 10, 2023

Professor Emeritus  
Department of Aerospace and Mechanical Engineering  
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## **Educational Background**

### *Undergraduate*

1963–1968  
Bachelor of Technology in Mechanical Engineering (First Class)  
Indian Institute of Technology, Madras, India  
Thesis project: Design of a four-stage radial compressor  
Advisor: Dr.-Ing. W. Scheer

### *Graduate*

1968–1970  
Department of Mechanics  
The Johns Hopkins University  
Baltimore, Maryland  
Thesis: Design, construction and experiments with a hot-wire anemometer vorticity meter  
Advisor: Professor L.S.G. Kovásznyai

1970–1974  
Doctor of Science with specialization in Fluid Mechanics  
Department of Aeronautics and Astronautics, Massachusetts Institute of Technology, Cambridge, Massachusetts  
Thesis: Interaction between scales in the problem of wave generation by wind  
Advisor: Professor E. Mollo-Christensen (Department of Meteorology)  
Doctoral Committee: Professor D.J. Benney (Department of Mathematics), Professor M.T. Landahl (Department of Aeronautics and Astronautics), Professor S. Widnall (Department of Aeronautics and Astronautics)

### *Continuing Education Courses*

1. Finite Element Analysis in Fluid Dynamics, one-week course organized by the Center for Continuing Education in Engineering, University of Texas, Austin, Texas, July 1979. Professors: J.T. Oden, Univ. of Texas, Austin; T.J. Chung, Univ. of Alabama, Huntsville; A.J. Baker, Univ. of Tennessee, Knoxville.

2. Non-Linear Partial Differential Equations, one-week course organized by the Faculty of Engineering, U.N.A.M., March 1980. Professor: W.F. Ames, Georgia Institute of Technology, Atlanta.
3. Fundamentals of Compressed Air Systems, June 1999, one-day course organized by the Department of Energy.

#### *Scholarships and Fellowships*

1. Merit Scholarship, Indian Institute of Technology, Madras, India, 1963–1968.
2. Whitehead Fellowship, The Johns Hopkins University, Baltimore, MD, academic year 1968–1969.
3. Du Pont Memorial Fellowship, Massachusetts Institute of Technology, Cambridge, MA, academic year 1970–1971.

## Professional Experience

#### *Predoctoral*

1. Practical Training, Larsen & Toubro, Ltd., Bombay, India, two months 1967.
2. Research Assistant to Professor L.S.G. Kovásznyai, The Johns Hopkins University, Baltimore, MD, 1969–1970.
3. Teaching Assistant to Professor W.S. Lewellen, Massachusetts Institute of Technology, Cambridge, MA, one semester 1971.
4. Research Assistant to Professor E. Mollo-Christensen, Massachusetts Institute of Technology, Cambridge, MA, 1971–1974.

#### *Postdoctoral*

1. Post-doctoral Fellow, Department of Meteorology, Massachusetts Institute of Technology, Cambridge, MA, Oct. 1974–Feb. 1975.
2. Professor Titular A<sup>1</sup>, Faculty of Engineering, National University of Mexico (U.N.A.M.), Mexico City, 1975–1976.
3. Visiting Professor, Faculty of Engineering, National University of Mexico (U.N.A.M.), Mexico City, 1976–1978.
4. Professor Titular B<sup>2</sup>, Faculty of Engineering, National University of Mexico (U.N.A.M.), Mexico City, 1978–1981.
5. Professor Titular C Definitivo<sup>3</sup>, Faculty of Engineering, National University of Mexico (U.N.A.M.), Mexico City, 1981–1986.
6. Visiting Professor, Sibley School of Mechanical and Aerospace Engineering, Cornell University, Ithaca, NY, 1985–1986 (while on sabbatical from U.N.A.M.).
7. Associate Professor, Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, IN, Aug. 1986–Aug. 1994 (tenured 1989).
8. Full Professor, Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, IN, Aug. 1994–June 2017.
9. Professor Emeritus, Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, IN, July 2017–.

#### *Consulting and Other Activities*

1. Research Consultant to the Department of Solar Energy, Institute of Materials Research, National University of Mexico (U.N.A.M.), Mexico City, 1981–1983.
2. Research Consultant to the Institute of Engineering, National University of Mexico (U.N.A.M.), Mexico City, 1984–1985.
3. Consultant to Sundstrand Heat Transfer, Inc., Dowagiac, Michigan, summer 1989.

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<sup>1</sup>Roughly corresponds to Assistant Professor.

<sup>2</sup>Roughly corresponds to Associate Professor.

<sup>3</sup>Roughly corresponds to Full Professor with tenure.

4. Consultant to the Industrial Assessment Center, University of Notre Dame, 1996–2000.
5. University of Notre Dame London Program, Aug.–Dec. 2000, 2004.
6. Sabbatical at the Department of Thermo and Fluid Dynamics, Chalmers University of Technology, Göteborg, Sweden, Jan.–Aug. 2001.
7. Summer research, Department of Thermo and Fluid Dynamics, Chalmers University of Technology, Göteborg, Sweden, May–July 2002.

## Professional Recognition and Honors

1. Appointed National Researcher (Level II) by the National Research System (SNI) of the Government of Mexico, July 1984.
2. National Academy of Engineering (Mexico), Elected Coordinator for Mechanical Engineering (1980–1983).
3. Appointed Associate Ed for America, International Journal of Heat and Technology, published by CNR, Italy, 1986.
4. Listed in
  - (a) Who's Who in Technology, 6th Edition, (Ed.) A.L. Unterburger, Gale Research, Detroit, 1988–1989.
  - (b) Who's Who among Asian Americans, Gale Research, Detroit, MI, 1994.
  - (c) American Men and Women of Science, R.R. Bowker, New Providence, N.J., 1995–1996.
  - (d) The International Directory of Distinguished Leadership, American Biographical Institute, Raleigh, NC, 1994.
  - (e) Who's Who in Science and Engineering, Third Edition, 1996–1997, Marquis Who's Who, New Providence, NJ, 1996.
  - (f) Who's Who in the World, Seventeenth Edition, 2000, Marquis Who's Who, New Providence, NJ, 1996.
  - (g) Lexington Who's Who Registry, 1999/2000 Edition, Garden City, NJ.
5. Elected Fellow of the ASME, 1999.
6. “Master Mentor,” University of Notre Dame, 1999.
7. Fulbright Visiting Lecturer, Department of Mechanical Engineering, Indian Institute of Technology, Kanpur, India, April–May, 2000.
8. Kaneb Teaching Award, College of Engineering, University of Notre Dame, 2001.
9. Rev. Edmund P. Joyce, C.S.C., University of Notre Dame Award for Excellence in Undergraduate Teaching, 2009.
10. Distinguished Foreign Scientist, Nov. 11–Dec. 2, 2011, Central Mechanical Engineering Research Laboratory, Durgapur, West Bengal, India.

## Professional Membership and Service

### *Membership*

1. American Society for Mechanical Engineers (ASME), Student Member (1968–1970), Associate Member (1977–1979), Member (1979–1999), Fellow (1999–).
2. American Society for Engineering Education (ASEE), Member (1977–).
3. M.I.T. Chapter of the Society of the Sigma Xi (1973).
4. Institution of Engineers (India), Member (1978–).
5. National Academy of Engineering (Mexico), Life Member (1978–).
6. American Physical Society (APS), Member (1982–).
7. Combustion Institute (Mexican Section), Member (1982–1985).
8. Mexican Society of Heat Transfer (affiliated to the International Society) Founder Member (1983–), Vice-President (1983–1985).
9. New York Academy of Science, Member (1985–1986).
10. American Association for the Advancement of Science (AAAS), Member (1986–).
11. Society for Industrial and Applied Mathematics (SIAM), Member (1986–).

### *Professional Activities*

1. National Academy of Engineering (Mexico): Organizer of Mechanical Engineering sessions in Annual Congresses (1980–1983), President of Organizing Committee for VIII Annual Congress in Torreón, Mexico, 1982.
2. Second Mexican National Symposium on Thermal Sciences (1985): Member of Organizing Committee.
3. Mexican Society of Heat Transfer (affiliated to the International Society): Vice-President (1983–1985).
4. Selected by ASME to check ABET requirements in Mexican engineering schools.
5. Member of Steering Committee, Mid-West Fluid Mechanics Retreat, 1989–1990.
6. Chairman of session on Thermofluids, XVII Congress of the National Academy of Engineering (Mexico), Monterrey, Mexico, Sept. 1991.
7. Member of International Organizing Committee, First International Thermal Energy Congress, Marrakesh, Morocco, June 1993.
8. Chairman of sessions on (a) Hydraulic and Other Equipment, and (b) Heat and Mass Transfer, in II Latinamerican Conference on Turbomachinery, Cuernavaca, Mexico, Feb. 1993.
9. Member of International Committee, and Chairman of (a) Plenary and (b) Natural and Mixed Convection Sessions, in First International Thermal Energy Congress, Marrakesh, Morocco, June 1993.
10. Member of Latin American Committee on Heat and Mass Transfer (1996–).
11. Member of Scientific Committee, Seventh Latin American Congress on Heat and Mass Transfer, Salta, Argentina, Oct., 1998.
12. Member of Organizing Committee, 52nd Annual Meeting, American Physical Society Division of Fluid Dynamics, New Orleans, LA, 1999.
13. Co-organizer, Minisymposium on Turbulence as a Dynamical System, 2nd Annual Meeting, American Physical Society Division of Fluid Dynamics, New Orleans, LA, 1999.
14. Coordinating Scientist for USA, 5th ISHMT-ASME Heat and Mass Transfer Conference and 16th National Heat and Mass Transfer Conference, Calcutta, Jan. 2002.
15. Member of Scientific Committee, Eighth Latin American Congress on Heat and Mass Transfer, Veracruz, Mexico, 2001.
16. Member of Organizing Committee, Ninth Latin American Congress on Heat and Mass Transfer, San Juan, Puerto Rico, Oct. 2002.
17. Co-Organizer, Symposium on Flow Manipulation for Heat Transfer Enhancement, ASME 2nd Joint U.S.-European Fluids Engineering Summer Meeting, Miami, FL, July 17–20, 2006.
18. Co-Organizer, Second Symposium on Flow Manipulation and Active Control in the 5th Joint ASME/JSME Fluids Engineering Summer Conference, San Diego, CA, Jul. 30–Aug. 02, 2007.
19. Co-Organizer, Third Symposium on Flow Manipulation and Active Control in the ASME Fluids Engineering Division Summer Conference, Jacksonville, FL, Aug. 10–14, 2008.
20. Co-Organizer, Fourth Symposium on Flow Manipulation and Active Control in the ASME Fluids Engineering Division Summer Conference, Vail, CO, Aug. 2–6, 2009.
21. Co-Organizer, Fifth Symposium on Flow Manipulation and Active Control in the Third Joint U.S.-European Fluids Engineering Summer Meeting, Montreal, Canada, Aug. 1–5, 2010.
22. Co-Organizer, Sixth Symposium on Flow Manipulation and Active Control, ASME-JSME-KSME Joint Fluids Engineering Conference, Hamamatsu, Japan, July 24–29, 2011.
23. Co-Organizer, Seventh Symposium on Flow Manipulation and Active Control, ASME Fluids Engineering Conference, Puerto Rico, July 8–12, 2012.
24. Co-Organizer, Eighth Symposium on Flow Manipulation and Active Control, ASME Fluids Engineering Conference, Incline Village, July 7–11, 2013.
25. Co-Organizer, Ninth Symposium on Flow Manipulation and Active Control, ASME Fluids Engineering Conference, Aug. 3–7, Chicago, 2014.
26. Co-Organizer of Minisymposium on Engineering Applications of Fractional Derivatives, Eighth Vienna International Conference on Mathematical Modelling (MATHMOD), Feb. 18–20, 2015.
27. Co-Organizer, Tenth Symposium on Flow Manipulation and Active Control: Theory, Experiments and Implementation, ASME-JSME-KSME Joint Fluids Engineering Conference, July 26-31, 2015, Seoul, Korea.
28. Co-Organizer, Eleventh Symposium on Active Fluid Dynamics and Flow Control—Theory, Experiments and implementation, ASME, HT/FE/ICNMM Conferences, July 10-14, 2016, Washington, DC.

## Service at National University of Mexico

1. Appointed by the Council and Director of the Faculty of Engineering, National University of Mexico (U.N.A.M.), Mexico City, as Member of the Committee on Appointments and Promotions of the Division of Graduate Studies (1981–1984).
2. Appointed by the Head of the Division of Mechanical and Electrical Engineering, National University of Mexico (U.N.A.M.), Mexico City, as Coordinator of all Fluid Mechanics courses (1981–1985).
3. Commissioned by the Mexican Council of Science and Technology (CONACYT) to visit India and write a report on the state of Indian science and technology (1981).
4. Member of Examining Board for the students of the Faculty of Engineering, U.N.A.M., External Member for Anahuac University and Iberoamericana University, Mexico.
5. Member of Examining Board for promotion of professors of the Metropolitan University and the National School for Professional Studies, Mexico.

## Service at Notre Dame

1. Mechanical Engineering Undergraduate Curriculum Committee (1988–97).
2. Faculty advisor for Departmental Graduate Student Conference (1987–1989).
3. College of Engineering Computational Methods Advisory Committee (1988).
4. College of Engineering Fluid Mechanics and Transport Phenomena Advisory Committee (1988).
5. Elected to Department of Aerospace and Mechanical Engineering Committee on Appointments and Promotions (1989–1992, 1992–1995, 1995–1998, 1998–2001, 2007–2010, 2011–2014).
6. Department of Aerospace and Mechanical Engineering Graduate Studies Committee (1989–1992, Director 1990–1992).
7. Graduate School Liaison for minority students (1993–1994).
8. Member of Search Committee for Associate Provost (1995).
9. Member of Search Committee for Chairman of Department of Aerospace and Mechanical Engineering (1996).
10. College of Engineering Undergraduate Studies Committee (1993–1996, 1999–2002).
11. Elected College of Engineering representative to University Committee on International Studies (1993–1998).
12. Elected member of the College of Engineering Council (1998–2001).
13. Elected member of the University Graduate Council (1998–2001).
14. Member of the Department Honesty Committee (2001–2002).
15. Elected member of the University Academic Council (2002–2005).
16. Member of University Committee on Libraries (2003–2004).
17. Director of Undergraduate Studies, Department of Aerospace and Mechanical Engineering, (2003–2007).
18. Member of University Council for Academic Technologies (2006–2007).
19. Faculty advisor to Mechanical Engineering Honor Society Pi Tau Sigma (2013–2017)

## Short Courses Taught

### *Faculty of Engineering, National University of Mexico*

1. Partial differential equations, intersemestral course for staff and students, 1976.
2. Introduction to measurement systems, intersemestral course for staff and students, 1979.
3. Dynamic measurement, part of a course on Stress Measurements in Continuum Mechanics organized by the Center for Continuing Education of the Faculty of Engineering, 1978.
4. Finite elements in thermofluids, part of a course on Finite Elements in Mechanical Engineering organized by the Center for Continuing Education of the Faculty of Engineering, April 1982, March 1983, March 1984 and Feb. 1985.
5. Numerical methods applied to thermofluids problems, intersemestral course for staff and students, Nov. 1983.
6. Thermal control, two-day course for graduate students, Oct. 2003.

### *Other Institutions*

1. Mechanics of fluids, in the Technical Week of Electromechanical Engineering, Regional Technological Institute, Juchitán, Oaxaca, Mexico, March 1978.
2. Fluid mechanics, part of the course Fundamentals of Mechanical Engineering for the staff of the University of Zacatecas, Zacatecas, Mexico, April 1978.
3. Experimental methods, part of a course on Continuum Mechanics, Ninth Engineering Week, University of Querétaro, Querétaro, Mexico, Dec. 1980.
4. Heat transfer, course given to the staff of the Regional Technological Institute, Querétaro, Mexico, Dec. 1980.
5. Applied mathematics, part of a course on Nuclear Technology organized by the National Institute of Nuclear Research, Mexico City, Mexico, July 1980.
6. Hot-wire and hot-film anemometry, course organized by the University of Michoacán, Morelia, Mexico, Sept. 1981.
7. Boundary layer theory, course organized by the Faculty of Higher Studies, Cuautitlán (U.N.A.M.), Mexico, April 1982.
8. Hot-wire and laser Doppler anemometry, course organized by the Metropolitan University, Mexico City, Mexico, June 1982.
9. Experimental methods in fluid mechanics, course given to the staff of the Regional Technological Institute, Hermosillo, Sonora, Mexico, Aug. 1982.
10. Heat transfer, course organized by the Faculty of Higher Studies, Cuautitlán, U.N.A.M., Mexico, April 1983.
11. Numerical methods in fluid mechanics, part of a course in Fluid Mechanics given to the graduate students of the University of Guanajuato, Salamanca, Mexico, Aug. 1984.
12. Lectures on stability, Bifurcations and Chaos in Thermal Systems, Oct. 19–23, 1992, Universidad Simón Bolívar, Caracas, Venezuela.
13. Modeling by intelligent systems, June 7–11, 2007, 10 hours, Universidad Politécnica de Valencia in Alcoy, Spain.

### **Journal and Proposal Review**

1. National Academy of Engineering (Mexico) Annual Congress: Occasional reviewer in Thermofluids area (1977–).
2. Applied Mechanics Review, published by the ASME: Reviewer (1983).
3. International Journal of Heat and Technology, published by Pitagora Editrice, Bologna, Italy, under the auspices of the National Research Council of Italy (CNR): Member of the Editorial Advisory Board (1983–), Associate Editor for America (1986–).
4. Revista de la Sociedad Mexicana de Ingeniería Mecánica, Member of Editorial Committee (2003–).
5. Occasional reviewer for the following journals: Geotermia, Mexican Federal Electricity Commission; Journal of the National Academy of Engineering (Mexico); Ingeniería Mecánica: Tecnología y Desarrollo, SOMIM; International Journal of Heat and Mass Transfer, Pergamon Press; Numerical Heat Transfer, Hemisphere Publishing Corporation; Experimental Thermal and Fluid Science, Elsevier; Advances in Water Resources, CML Publications; American Institute of Aeronautics and Astronautics Journal, AIAA; Journal of Thermophysics and Heat Transfer, AIAA; Journal of Fluid Mechanics, Cambridge University Press; Mechanics Research Communications, Pergamon Press; Journal of Fluids Engineering, ASME; Physics of Fluids, American Institute of Physics; Chemical Engineering Science, Elsevier; Chemical Engineering Communications, Gordon and Breach; Journal of Heat Transfer, ASME; American Institute of Chemical Engineers Journal, AIChE; Chaos, American Institute of Physics; Numerical Methods for Partial Differential Equations, Wiley; International Journal of Modelling and Simulation, IASTED; Aerosol Science and Technology, Taylor & Francis; International Journal for Numerical Methods in Engineering, Wiley; Experiments in Fluids, Springer; Heat Transfer Engineering, Taylor & Francis; Revista de la Sociedad Mexicana de Física, SMF; Journal of Enhanced Heat Transfer, Gordon and Breach; International Journal of Control and Intelligent Systems, ACTA Press; Acta Mechanica, Springer; Microscale Thermophysical Engineering, Taylor & Francis; Journal

of Petroleum Science & Engineering, Elsevier; Applied Thermal Engineering, Elsevier; Experimental Heat Transfer, Taylor & Francis; Transactions on Components and Packaging Technologies, IEEE; International Journal of Vehicle System Modelling and Testing, Interscience Publishers; Lasers in Surgery and Medicine, Wiley.

6. Proposals reviewed for: National Science Foundation; Dutch Stichting voor Fundamenteel Onderzoek der Materie; Mexican National Council for Science and Technology (CONACYT); Idaho Board of Education Specific Research Grant Program; Department of Defense Experimental Program to Stimulate Competitive Research; University of Notre Dame Faculty Research Program; Petroleum Research Fund; Center for Indoor Air Research; Mexican Petroleum Institute (IMP); Council for International Exchanger of Scholars (Fulbright Scholars), National Sciences and Engineering Research Council of Canada, Los Alamos National Laboratory; Agence Nationale de la Recherche, France.

## Publications

### BOOKS

1. *Mathematical Methods in Engineering*, J.M. Powers and M. Sen, Cambridge University Press, ISBN 978-1-107-03704-5, 2015. Reviewed by A. Cheung, *The Mathematical Gazette*, Vol. 100, No. 549, pp. 562-563, November 2016.
2. *Undergraduate Lectures on Fluid Mechanics*, M. Sen, Mechanical Engineering Series, Eds. S. Paolucci and M. Sen, ISBN 978-1087203379, 2019.

### CHAPTERS IN BOOKS (REFEREED)

1. The influence of developments in dynamical systems theory on experimental fluid mechanics, Sen, M., in *Frontiers in Experimental Fluid Mechanics*, (Ed.) M. Gad-el-Hak, Lecture Notes in Engineering, Springer-Verlag, Berlin, Germany, Vol. 46, pp. 1–23, 1989.
2. Chaotic mixing for heat transfer enhancement, H.-C. Chang and M. Sen, in *Applied Chaos*, (Eds.) J.H. Kim, J. Stringer, John Wiley & Sons, New York, Chap. 6, pp. 175–188, 1992.
3. One-dimensional modeling of thermosyphons with known heat flux, M. Sen, C. Treviño and E. Ramos, in *Trends in Heat, Mass and Momentum Transfer*, (Eds.) J. Menon, Council of Scientific Research Integration, Trivandrum, India, Vol. 2, pp. 161–172, 1992.
4. Capillary tube boiling, M. Sen, in *Experiments in Heat Transfer and Thermodynamics*, (Ed.) R.A. Granger, Cambridge University Press, Cambridge, U.K., pp. 127–134, 1994.
5. Chaotic particle paths and heat transfer in internal flows, M. Sen and H.-C. Chang, in *Towards the Harnessing of Chaos*, (Ed.) M. Yamaguti, Elsevier, Amsterdam, Holland, pp. 397–400, 1994.
6. Applications of artificial neural networks and genetic algorithms in thermal engineering, M. Sen and K.T. Yang, Section 4.24, pp. 620–661, in *The CRC Handbook of Thermal Engineering*, (Ed.) F. Kreith, CRC Press, Boca Raton, FL, 2000.
7. Soft computing in control, M. Sen and J.W. Goodwine, Chapter 14, pp. 1–37, in *The MEMS Handbook*, (Ed.) M. Gad-el-Hak, CRC Press, Boca Raton, FL, 2nd ed., 2006.
8. Dynamics of large rings of coupled Van der Pol oscillators, M.A. Barrón, M. Sen and E. Corona, in *Innovations and Advanced Techniques in Systems, Computing Sciences and Software Engineering*, (Ed.) K. Elleithy, Springer, pp. 346-349, 2008.
9. Analysis of experimental data from complex multibody system, J.C. Jáuregui-Correa, C.S. López Cajún, and M. Sen, in *Multibody Mechatronic Systems*, (Eds.) M. Ceccarelli, E. Hernandez, pp. 211-218, Springer, 2015.
10. Applications of artificial neural networks and genetic methods in thermal engineering, A. Pacheco-Vega, G. Diaz, M. Sen and K.T. Yang, Section 4.27, pp. 1217–1269, in *The CRC Handbook of Thermal Engineering*, Second Edition, (Ed.) R. Chhabra, CRC Press, Boca Raton, FL, 2017.
11. Review of synchronization in mechanical systems, M. Sen and C.S. López Cajún, in *Nonlinear Structural Dynamics and Damping*, pp. 45–70, (Ed.) J.C. Jáuregui, Vol 69 of *Mechanisms and Machine Science*, Springer, 2019.

JOURNAL PUBLICATIONS (REFEREED)

12. Cooling of a thin flat plate of high conductivity exposed to a laminar convective flow (in Spanish), C. Treviño and M. Sen, *Journal of the Mexican Petroleum Institute*, Vol. XII, No. 2, pp. 73–79, 1980.
13. Effects of chemical recombination on the flow of a reactive mixture (in Spanish), C. Treviño and M. Sen, *Electromecánica*, Vol. 5, No. 2, pp. 4–7, 1980.
14. Effect of plate thermal resistance on boundary layer ignition, C. Treviño and M. Sen, *Combustion and Flame*, Vol. 43, pp. 121–129, 1981.
15. Dynamic analysis of a one-dimensional thermosyphon model, M. Sen and C. Treviño, *Journal of Thermal Engineering*, Vol. 3, No. 1, pp. 15–20, 1982.
16. Effect of Prandtl number on boundary layer ignition, C. Treviño and M. Sen, *Combustion and Flame*, Vol. 46, pp. 211–212, 1982.
17. Ignition criteria in boundary layer flows, C. Treviño and M. Sen, *Latin American Journal of Heat and Mass Transfer*, Vol. 6, No. 4, pp. 235–250, 1982.
18. Numerical solution of the stability equation of a one-dimensional conductive system with phase change, R. Avila, M. Sen and J. Cervantes, *American Journal of Heat and Mass Transfer*, Vol. 7, No. 2, pp. 173–185, 1983.
19. One-dimensional thermosyphon analysis, M. Sen and C. Treviño, *Latin American Journal of Heat and Mass Transfer*, Vol. 7, No. 2, pp. 135–150, 1983.
20. The toroidal thermosyphon with known heat flux, M. Sen, E. Ramos and C. Treviño, *International Journal of Heat and Mass Transfer*, Vol. 28, No. 1, pp. 219–233, 1985.
21. Catalytic combustion in stagnation-point flow, C. Treviño and M. Sen, *Wärme-und Stoffübertragung*, Vol. 19, pp. 159–166, 1985.
22. One-dimensional modeling of multiple loop thermosyphons, M. Sen and J. L. Fernández, *International Journal of Heat and Mass Transfer*, Vol. 28, No. 9, pp. 1788–1790, 1985.
23. A steady-state analysis for variable area one-and two-phase thermosyphons, E. Ramos, M. Sen and C. Treviño, *International Journal of Heat and Mass Transfer*, Vol. 28, No. 9, pp. 1711–1719, 1985.
24. On the steady-state velocity of the inclined toroidal thermosyphon, M. Sen, E. Ramos and C. Treviño, *ASME Journal of Heat Transfer*, Vol. 107, No. 4, pp. 974–977, 1985.
25. Catalytic combustion in monolith reactors, C. Treviño and M. Sen, *Chemical Engineering Science*, Vol. 41, No. 9, pp. 2253–2260, 1986.
26. Two-phase natural circulation in a toroidal loop, E. Manero, M. Sen and E. Ramos, *Wärme und Stoffübertragung*, Vol. 21, pp. 41–49, 1987.
27. Natural convection in a thin horizontal porous annulus, M. Sen and K.E. Torrance, *International Journal of Heat and Mass Transfer*, Vol. 30, No. 4, pp. 729–739, 1987.
28. Numerical study of natural convection in a tilted rectangular porous material, S.L. Moya, E. Ramos and M. Sen, *International Journal of Heat and Mass Transfer*, Vol. 30, No. 4, pp. 741–756, 1987.
29. Natural convection in a semi-elliptical cavity, E. Martin del Campo, M. Sen and E. Ramos, *Numerical Heat Transfer*, Vol. 12, No. 1, pp. 101–119, 1987.
30. Linear stability of a cylindrical falling film, F.J. Solorio and M. Sen, *Journal of Fluid Mechanics*, Vol. 183, pp. 365–377, Oct. 1987.
31. Single-phase natural circulation in a tilted square loop, R. Acosta, M. Sen and E. Ramos, *Wärme-und Stoffübertragung*, Vol. 21, No. 5, pp. 269–275, 1987.
32. A one-dimensional model of a thermosyphon with known wall temperature, M. Gordon, E. Ramos and M. Sen, *International Journal of Heat and Fluid Flow*, Vol. 8, No. 3, pp. 177–181, Sept. 1987.
33. Multiple steady-states for unicellular natural convection in an inclined porous layer, M. Sen, P. Vasseur and L. Robillard, *International Journal of Heat and Mass Transfer*, Vol. 30, No. 10, pp. 2097–2113, 1987.
34. Thermal degasification of ammonia in a porous generator, M. Sen, R. Best and I. Pilatowsky, *Applied Scientific Research*, Vol. 44, No. 3, pp. 341–359, 1987.
35. Turbulent convection in helicoidal tubes, M. Chávez, W. Zhixue and M. Sen, *Wärme-und Stoffübertragung*, Vol. 22, No. 1–2, pp. 55–60, 1988.
36. Simple modeling procedure for estimation of cyclonic wind speeds, J. Sánchez-Sesma, J. Aguirre and M. Sen, *ASCE Journal of Structural Engineering*, Vol. 114, No. 2, pp. 352–370, 1988.



37. Initial behavior of solutions to the Lorenz equations, W. Fiszdon and M. Sen, *International Journal of Non-Linear Mechanics*, Vol. 23, No. 1, pp. 53–66, 1988.
38. Analytical and experimental study of steady-state convection in a double loop thermosyphon, M. Sen, D. Pruzan and K.E. Torrance, *International Journal of Heat and Mass Transfer*, Vol. 31, No. 4, 709–722, 1988.
39. Analysis of laminar natural convection in a triangular enclosure, E. Martín del Campo, M. Sen and E. Ramos, *Numerical Heat Transfer*, Vol. 13, No. 3, pp. 353–372, 1988.
40. Flow in conjugate natural circulation loops, O. Salazar, M. Sen and E. Ramos, *AIAA Journal of Thermophysics and Heat Transfer*, Vol. 2, No. 2, pp. 180–183, 1988.
41. Parallel flow convection in a tilted two-dimensional porous layer heated from all sides, M. Sen, P. Vasseur and L. Robillard, *Physics of Fluids*, Vol. 31, No. 12, pp. 3480–3487, 1988.
42. An inflow-outflow characterization of inhomogeneous permeable beds, M. Sen and K.T. Yang, *Transport in Porous Media*, Vol. 4, pp. 97–104, 1989.
43. The effect of axial conduction on a thermosyphon with prescribed heat flux, M. Sen, E. Ramos, C. Treviño and O. Salazar, *European Journal of Mechanics, B/Fluids*, Vol. 8, No. 1, pp. 57–72, 1989.
44. The Brinkman model for natural convection in a shallow porous cavity with uniform heat flux, P. Vasseur, C.H. Wang and M. Sen, *Numerical Heat Transfer, Part A: Applications*, Vol. 15, No. 2, pp. 221–242, 1989.
45. Longitudinal and transverse dimensions of an incipient jet driven by a constant head, M. Sen, J. Hernández and J. Cervantes, *Experiments in Fluids*, Vol. 8, pp. 107–109, 1989.
46. Thermal instability and natural convection in a fluid layer over a porous substrate, P. Vasseur, C.H. Wang and M. Sen, *Wärme-und Stoffübertragung*, Vol. 24, pp. 337–347, 1989.
47. Natural convection in an inclined rectangular porous slot: the Brinkman extended Darcy model, P. Vasseur, C.H. Wang and M. Sen, *ASME Journal of Heat Transfer*, Vol. 112, No. 2, pp. 507–511, 1990.
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292. Preliminary design of a passive thermal control for a microsatellite (in Spanish), Eric Tejada, Tang Yu and M. Sen, Proceedings of the *XX Congress of the SOMIM*, Sept. 24–26, 2014, Juriquilla, Qro., Mexico.
293. Parametric identification of fractional order nonlinear systems, Ajith Kuriakose Mani, M.D. Narayanan, Mihir Sen, Proceedings of the *National Conference on Applied Nonlinear Dynamics*, Dec. 21-22, 2016, National Institute of Technology Warangal, India.
294. An application of fractional calculus to the tomographic identification of structural damage, S. Buonocore, M. Sen, F. Semperlotti, Conference on Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems, Las Vegas, NV, Mar 21-24, 2016, Proceedings of SPIE, Volume 9803, Article Number: UNSP 98030Y0, 2016.
295. Vinod V, B. Balaram, M.D. Narayanan, M. Sen, An initial condition dependent oscillation control in an odd and even number van der Pol ring, 10th Conference on Nonlinear Systems and Dynamics, IISER, Kolkata, India, 2016.
296. Vibration analysis of discrete parameter systems using fractional order models, J.P. Hollkamp, M. Sen, F. Semperlotti, Conference on Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems, Portland, OR, Mar 26-29, 2017, Proceedings of SPIE, Volume 10168, Article Number UNSP 101682V, 2017.
297. Models from an implicit operator describing a large mass-spring-damper network, K. Leyden, M. Sen and B. Goodwine, 9th Vienna International Conference on Mathematical Modelling, February 21-23, 2018, Vienna, Austria, published in FAC Papers OnLine 51-2, 831-836.
298. Fractional-order-based system identification for heat exchangers, K.M. Li, M. Sen and A. Pacheco-Vega, Proceedings of the *3rd World Congress on Momentum, Heat and Mass Transfer (MHMT’18)*, Budapest, Hungary, April 12 –14, 2018, Paper No. ENFHT 134.
299. Solid-state thermoacoustics, H. Hao, C. Scalo, M. Sen and F. Semperlotti, *Internoise 2018*, Chicago, IL, Aug. 26–29, 2018.
300. Anomalous diffusion in acoustic phononic crystals, S. Buonocore, M. Sen and F. Semperlotti, *Internoise 2018*, Chicago, IL, Aug. 26–29, 2018.
301. Anomalous diffusion in periodic phononic crystals, S. Buonocore, M. Sen and F. Semperlotti, *9th International Conference on Computational Methods*, Aug. 6–10, 2018, Rome.
302. Mathematical modeling and parametric identification of a magneto rheological elastomer using fractional calculus, A. Mani, M.D. Narayanan and M. Sen, First International Nonlinear Dynamics Conference, Feb. 17–20, 2019, Rome, Italy.

303. Fractional-PD <sup>$\mu$</sup>  controllers for implicitly defined systems, A.J. Guel-Cortez, M. Sen, C.-F. Méndez-Barrios and B. Goodwine, 6th International Conference on Control, Decision and Information Technologies, Paris, France, April 23–26, 2019.
304. Closed form time response of an infinite tree of mechanical components described by an irrational transfer function, A.-J. Guel-Cortez, M. Sen and B. Goodwine, American Control Conference, Philadelphia, PA, July 10–12, 2019.

*Based on Review of Abstract*

305. Non-linear interaction in shallow water waves (in Spanish), J.L. Samaniego and M. Sen, *Proceedings of the Fifth National Congress on Hydraulics*, Vol. 4, Guadalajara, Mexico, 1978.
306. Analog simulator of problems in thermofluids (in Spanish), A. Salas, A. Sánchez and M. Sen, *Proceedings of Mexicón 78*, Institution of Electrical and Electronics Engineers, Mexico City, Mexico 1978.
307. Numerical methods in fluid mechanics, M. Sen and C. Treviño, *Proceedings of the Third Symposium on Mechanical Engineering*, Regional Technological Institute, Mérida, Mexico, 1979.
308. Considerations on the use of methane from anaerobic digestors in combustion processes (in Spanish), C. Treviño and M. Sen, *Proceedings of the Second International Meeting on Alternative Sources of Energy*, University of Michoacán, Morelia, Mexico, 1979.
309. Construction of a capacitive level transducer (in Spanish), G. Olayo, R. Barrios, A. Sánchez and M. Sen, *Proceedings of Mexicón 79*, Institution for Electrical and Electronics Engineers, Mexico City, Mexico, 1979.
310. Transient one-dimensional model of a thermosyphon solar heater (in Spanish), J. Rojas, M. Sen and C. Treviño, *Proceedings of the Fourth National Meeting on Solar Energy*, San Luis Potosí, Mexico, 1980.
311. The two-phase thermosyphon: A one-dimensional model (in Spanish), M. Sen, C. Treviño, E. Ramos and B.C. Raychaudhuri, *Proceedings of the Sixth National Meeting on Solar Energy*, La Paz, Mexico, pp. 115–117, 1982.
312. Effect of longitudinal conduction on a solar thermosyphon (in Spanish), M. Sen and C. Treviño, *Proceedings of the Sixth National Meeting on Solar Energy*, La Paz, Mexico, pp. 87–90, 1982.
313. Theoretical model of convection in a wind tower (in Spanish), S.L. Moya, E. Ramos and M. Sen, *Proceedings of the Sixth National Meeting on Solar Energy*, La Paz, Mexico, pp. 96–100, 1982.
314. Desorption of ammonia in a porous solid (in Spanish), M. Sen, R. Best and I. Pilatowsky, *Proceedings of the First Latin American Congress on Heat and Mass Transfer*, La Plata, Argentina, Vol. 2 pp. 950–966, 1982.
315. Natural convection in a two-dimensional cavity: Finite difference calculations (in Spanish), S.L. Moya, M. Sen and E. Ramos, *Proceedings of the Seventh National Meeting on Solar Energy*, Saltillo, Mexico pp. 29–33, 1983.
316. Natural convection in a two-dimensional cavity: Finite element calculation (in Spanish), E. Martín del Campo and M. Sen, *Proceedings of the Seventh National Meeting on Solar Energy*, Saltillo, Mexico, pp. 20–23, 1983.
317. Natural convection in square cavities (in Spanish), S.L. Moya, E. Ramos and M. Sen, *Proceedings of the Eighth National Meeting on Solar Energy*, pp. 103–106, 1984.
318. Experimental studies of heat transfer in viscoelastic flow through pipes: Application to Solar Energy Collectors, B. Mena, F. Avila and M. Sen, Eighth International Congress on Rheology, Naples, Italy, 1980, published in *Rheology, Vol. 2: Fluids*, (Eds.) G. Astarita, G. Marrucci, L. Nicolais, Plenum Publishing Corporation, pp. 93–96, 1980.
319. Medium and large Deborah number squeezing flows, D. Binding, F. Avila, M. Sen and A. Maldonado, Eighth International Congress on Rheology, Naples, Italy, 1980, published in *Rheology, Vol. 2: Fluids*, (Eds.) G. Astarita, G. Marrucci, L. Nicolais, Plenum Publishing Corporation, pp. 111–116, 1980.
320. Visual observations of an incipient round jet, E. Rincón, M. Sen and J. Cervantes, Sixteenth South-eastern Seminar on Thermal Sciences, Miami, Florida, 1982, published in *Thermal Sciences 16*, Vol. 1, (Ed.) T.N. Veziroglu. Hemisphere Publishing Corporation, pp. 135–140, 1983.
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322. Transient response of steam flow to water injection, V. López, R. Escalera, J. Cervantes and M. Sen, *Proceedings of Condensed Papers–3rd Multi-Phase Flow and Heat Transfer Symposium-Workshop*, Clean Energy Research Inst, University of Miami, Florida, p. 304, 1983.
323. Effect of power law friction factor on a toroidal thermosyphon, M. Sen, E. Ramos and C. Treviño, Ninth Congress on Rheology, Acapulco, Mexico, published in *Advances in Rheology*, (Eds.) B. Mena, A. Garcia-Rejón, C. Rangel-Nafaile, Vol. 2: Fluids, Elsevier Science Publishers, pp. 59–71, 1984.
324. Natural convection in a trapezoidal porous medium, S.J. Pien and M. Sen, *Proceedings of the Symposium in Heat and Mass Transfer in Honor of B.T. Chao*, pp. 481–492, University of Illinois-Urbana, 1987.
325. The parallel flow approximation for natural convection in Rectangular Geometries, M. Sen, P. Vasseur and L. Robillard, *Proceedings of the Third Latin American Congress on Heat and Mass Transfer*, Guanajuato, Mexico, pp. 1–10, 1988.
326. Stability and Natural Convection in a Fluid Overlaying a Porous Medium, C.H. Wang, P. Vasseur and M. Sen, *Proceedings of the 12th Canadian Congress of Applied Mechanics*, pp. 108–109, Ottawa, 1989.
327. Stability of flow in a rotating open loop thermosyphon, M. Sen, M.A. Stremmler, D.R. Sawyers, *Proceedings of II Latin American Conference on Turbomachinery*, Cuernavaca, Mexico, pp. 421–426, 1993.
328. Thermoacoustic machines, M. Sen, H.-C. Chang and D. Omari, *Proceedings of the 5th Latin American Congress of Heat and Mass Transfer*, Caracas, Venezuela, pp. CP2.1–CP2.8, 1994.
329. An artificial neural network model of a heat exchanger, X. Zhao, R.L. McClain, M. Sen and K.T. Yang, *Symposium on Thermal Science and Engineering in Honor of Chancellor Chang-Lin Tien*, November 1995, pp. 83–88.
330. Modeling of heat transfer in free convection nucleate boiling with artificial neural networks, Part I: Literature Survey (in German), G. Díaz, J. Schmadl, T. Schutz and M. Sen, *Wissenschaftliche Beiträge*, Technische Fachhochschule Wildau, Heft 2, 2000, pp. 30–35.
331. Modeling of heat transfer in free convection nucleate boiling with artificial neural networks, Part II: Single Component (in German), G. Díaz, J. Schmadl, T. Schutz and M. Sen, *Wissenschaftliche Beiträge*, Technische Fachhochschule Wildau, Heft 2, 2000, pp. 36–42.
332. Evolutionary model for bone adaptation using cellular automata, A. Tovar, N. Patel, G.A. Letona, G.L. Niebur, M. Sen and J.E. Renaud, Poster at *14th Conference of the European Society of Biomechanics*, Hertogenbosch, The Netherlands, 2004.
333. A Molecular Dynamic Study of Properties of Nanofluids, S. Paolucci, G. Puliti and M. Sen, 10th US National Congress on Computational Mechanics, July 16–19, 2009, Columbus, OH.
334. Properties of nanofluids, G. Puliti, S. Paolucci, M. Sen, Division of Fluid Dynamics, American Physical Society, 2009.
335. Nonlocal theory for flow in porous media. M. Sen, Notre Dame University, USA and E. Ramos, LII National Congress of Physics, Acapulco, Mexico, Oct. 26–30, 2009.
336. Molecular Dynamic Study of Properties of Nanofluids: Thermodynamics, Gianluca Puliti, Samuel Paolucci and Mihir Sen, 2010 Midwest Thermodynamics and Statistical Mechanics Conference, June 2–3, 2010, Notre Dame, IN.
337. Non-local model for flow in porous media, E. Ramos and M. Sen, Ninth North American Workshop on Applications of the Physics of Porous Media, CICESE, Ensenada, Mexico, Oct. 26–29, 2011.
338. Properties of water-gold nanofluids, G. Puliti, S. Paolucci and M. Sen, 64th Annual Meeting of the APS Division of Fluid Dynamics, Nov. 21, 2011, Baltimore, MD.
339. Thermodynamic and transport properties of water/gold nanofluids using equilibrium molecular dynamics, G. Puliti, S. Paolucci and M. Sen, ASME 3rd Micro/Nanoscale Heat & Mass Transfer International Conference, Mar. 3–6, 2012, Atlanta, GA.
340. Effect of walls on synchronization of thermostatic room-temperature oscillations, M. Sen, XIX Congreso de la SOMIM, Salamanca, Mexico, Sept. 19–21, 2012.
341. Evaluation of ionic fluids as lubricants in manufacturing, A. Libardi, S.R. Schmid, M. Sen and W. Schneider, Proceedings of NAMRI/SME, June 10–14, 2013, Madison, WI, Paper No. NAMRC41-1619, Vol. 41, 2013 (NAMRI/SME Outstanding Paper).
342. Building energy management: Construction and characterization of an environmental test chamber, R. Chávez-Martínez and M. Sen, IMECE2014-36599, Montreal, Canada, Nov. 14–20, 2014.

343. Building energy management: Thermal modeling, CFD simulation and small-scale experimentation, N. Yu, R. Chávez-Martínez, S. Salakij, M. Sen, S. Paolucci and P. Antsaklis, IMECE2014-36600, Montreal, Canada, Nov. 14–20, 2014.
344. Heavy tailed distributions in diffused wave-fields: a new tool for imaging through scattering media?, S. Buenocore, M. Sen, and F. Semperlotti, Engineering Mechanics Institute Conference, Vanderbilt University, Nashville, TN, May 22-25, 2016.
345. Model order reduction of non-homogeneous discrete systems using fractional calculus, J.P. Hollcamp, M. Sen and F. Semperlotti, Engineering Mechanics Institute Conference, San Diego, June 4-7, 2017.
346. Synchronization of natural convection in thermostatically-controlled adjacent cavities, R. Chavez-Martinez, M. Sanchez-Lopez, F. Solorio-Ordaz, M. Sen, 70th Annual Meeting of the APS, Nov. 19-21, 2017, Denver, Colorado.
347. Numerical simulation of the a laser conduction limited weld pool by vortex-stream function implementation coupled with the Rosenthal solution, J. Ramos-Grez and M. Sen, IV International Conference on Welding and Joining of Materials ICONWELD 2018, Lima, Peru.
348. Synchronization of natural convection in thermostatically controlled adjacent cavities: effect of common wall properties, R. Chávez-Martínez, Mario Sánchez-López, Francisco Javier Solorio, Mihir Sen, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA, Nov. 18–20, 2018.

## Non-Technical Publications

349. Graduate programs in the thermosciences at the School of Engineering of the National University of Mexico, M. Sen and J. Cervantes, *Proceedings of the Frontiers in Education Conference*, American Society of Engineering Education–Institution for Electrical and Electronics Engineers, Buena Vista, Florida, pp. 100–104, 1978.
350. Postgraduate education as a necessary base for the creation of technology in developing countries (in Spanish), J. Cervantes and M. Sen, *Proceedings of the Second Symposium on Engineering*, University of Central America, El Salvador, 1979.
351. Postgraduate education in mechanical engineering and the creation of technology (in Spanish), J. Cervantes and M. Sen, *Proceedings of the Ninth National Biennial Congress of the College of Mechanical and Electrical Engineers*, Mexico City, Mexico, pp. 110–120, 1980.
352. Science and technology in India (in Spanish), M. Sen, *Ciencia y Desarrollo*, CONACYT, (Mexico), Vol. II, No. 41, pp. 6–53, 1981.
353. Development of a curriculum for mechanical engineering based upon intelligent systems and automation, S. Batill, S. Skaar, R. Nelson, B. Goodwine, J. Mason, and M. Sen, Session 1526, *Proceedings of the 2002 American Society for Engineering Education Annual Conference and Exposition*.
354. J.-D. Yoder and M. Sen, Development of an undergraduate intelligent systems laboratory and class with a collaborative, remote experiment, Paper No. AC 2007-1600, *Proceedings of the ASEE Annual Conference and Exposition*, Honolulu, Hawaii, June 24–27, 2007.
355. L. Wang, Y. Jaluria, M. Kelleher, J. Lloyd, W.J. Minkowycz, M. Sen and R. Shah, In celebration: Professor K.T. Yang on his 80th birthday, *International Journal of Heat and Mass Transfer*, Vol. 52, pp. 2923-2924, 2009.

## Reports

1. Computation of natural convection in rotating systems, M. Sen, Report to the Jesse H. Jones Faculty Research Fund, 1988.
2. Deterministic chaos in nucleate boiling, M. Sen, Report to the National Science Foundation, Washington, DC, 1989.
3. A spectral method computation of convection in a porous annulus, M. Sen, Report to the National Center for Supercomputer Applications, University of Illinois, Urbana-Champaign, 1990.
4. Research in nucleate boiling, Scientific Visit to Mexico, M. Sen, Report to the National Science Foundation, 1989.
5. Continuously-focusable microscope system for droplet characterization in various flows, P.F. Dunn and M. Sen, Report to the Jesse H. Jones Faculty Research Equipment Fund, 1991.



6. Heat transfer enhancement by chaotic mixing, M. Sen and H.-C. Chang, Annual Reports to the Gas Research Institute, 1991, 1992.
7. Solidification of metals in die casting, S. Das, S. Paolucci and M. Sen, Report to AE Piston Products, Inc., 1991.
8. Low flow coil test program, Report to Brdg-Tndr, K.T. Yang, M. Sen, R.L. McClain, T.M. Pieters, 1992; K.T. Yang, M. Sen, R.L. McClain, X. Zhao, 1993.

## Presentations without Proceedings, or Short Papers and Abstracts

1. Strong interaction between surface waves, M. Sen and E. Mollo-Christensen, American Physical Society Fluid Dynamics Division Meeting, 1974.
2. Finite amplitude gravity waves, E. Medina and M. Sen, Mexican Society of Physics, 1977.
3. Dynamic analysis of a one-dimensional thermosyphon, M. Sen and C. Treviño, Solar World Forum, International Solar Energy Society, Brighton, England 1981.
4. Solution to the problem of gas absorption in small concentrations in a falling film (in Spanish), A. Sámano and M. Sen, First Latin American Congress on Heat and Mass Transfer, La Plata, Argentina, 1982.
5. Transient round jets: Some visual observations, J. Cervantes, M. Sen and J. Hernández, American Physical Society Fluid Dynamics Meeting, 1983.
6. Time-dependent behavior of a toroidal thermosyphon, M. Sen, E. Ramos and C. Treviño, American Physical Society Fluid Dynamics Meeting, 1983.
7. Review of M. Strada and J.C. Heinrich, Numerical Heat Transfer 5, 81–93, 1982, *Applied Mechanics Review*, Vol. 36, No. 7, p. 1015, July 1983.
8. Review of V.K. Polevikov, USSR Computational Mathematics and Mathematical Physics 21, 126–137, 1982, *Applied Mechanics Review*, Vol. 36, No. 7, p. 1016, July 1983
9. Review of P. Vasseur and L. Robillard, Wärme-und Stoffübertragung 16, 199–207, 1982, *Applied Mechanics Review*, Vol. 36, No. 9, p. 1275, Sept. 1983
10. Review of V.A. Akinsete and T.A. Coleman, International Journal of Heat and Mass Transfer 25, 991–998, 1982, *Applied Mechanics Review*, Vol. 36, No. 10, p. 1424, Oct. 1983
11. Review of M.A. Azoumi and C. Normand, Geophysical and Astrophysical Fluid Dynamics 23, 209–245, 1983, *Applied Mechanics Review*, Vol. 36, No. 12, p. 1709, Dec. 1983
12. Convective loop with axial conduction, M. Sen, E. Ramos, C. Treviño and O. Salazar, American Physical Society Fluid Dynamics Meeting, 1984.
13. Heat transfer in an inclined porous square material, E. Ramos, S.L. Moya and M. Sen, American Physical Society Fluid Dynamics Meeting, 1984.
14. Asymptotic analysis of a monolith catalytic combustor, C. Treviño and M. Sen, Joint Western and Eastern Sections Meeting of the Combustion Institute, 1985.
15. Natural convective modes in a tilted toroidal thermosyphon, E. Ramos and M. Sen, American Physical Society Fluid Dynamics Meeting, 1985.
16. Stability of a cylindrical falling film (in Spanish), Second National Symposium on Thermal Sciences, F.J. Solorio and M. Sen, Mexico City, 1985.
17. The Galerkin method applied to the analysis of flow around a droplet in a current of air (in Spanish), E. Rincón and M. Sen, Second National Symposium on Thermal Sciences, Mexico City, 1985.
18. Nonunique solutions of a second order boundary value problem, H.M. Atassi and M. Sen, Society for Industrial and Applied Mathematics Meeting, Chicago, IL, 1990.
19. Estimation of diffusion in chaotically mixed systems, S. Ghosh, N. Acharya, M. Sen and H.-C. Chang, AIChE Annual Meeting, Chicago, 1990.
20. On the nonlinear dynamics of a rotatable cylinder-splitter plate body, M. Gad-el-Hak, M. Sen and J.C. Xu, American Physical Society Fluid Dynamics Meeting, Bulletin of the American Physical Society 35, pp. 22571/22258, 1990.
21. Heat transfer enhancement by chaotic advection in an eccentric annulus, S. Ghosh, H.-C. Chang, N. Acharya and M. Sen, Second International Conference on Industrial and Applied Mathematics, Washington, D.C., 1991.
22. Numerical study of heat transfer enhancement by chaotic mixing, N. Acharya, S. Ghosh, H.-C. Chang, M. Sen, Mixing XIII, Engineering Foundation Conferences, Banff, Canada, 1991.

23. Enhancement of heat transfer by chaotic mixing, S. Ghosh, H.-C. Chang, N. Acharya and M. Sen, AIChE Annual Meeting, Los Angeles, 1991.
24. Enhancement of in-tube heat transfer in coiled tubes by chaotic mixing, H.C. Chang, N. Acharya, S. Ghosh and M. Sen, AIChE Annual Meeting, Los Angeles, 1991.
25. Chaotic mixing with chemical reaction, D.R. Sawyers, M. Sen, H.-C. Chang, XVIII International Congress of Theoretical and Applied Mechanics, Haifa, Israel, Aug. 22–28, 1992.
26. Numerical and experimental investigation of flow past a freely rotatable square cylinder, T. Zaki, M. Sen and M. Gad-el-Hak, American Physical Society Fluid Dynamics Meeting, Bulletin of the American Physical Society 38, pp. 2263–2264, 1993.
27. Effect of regular and chaotic mixing on bimolecular chemical reaction in helical coil reactors, D.R. Sawyers, M. Sen and H.-C. Chang, AIChE Annual Meeting, St. Louis, 1993.
28. Temperature measurements on an aluminum alloy permanent mold casting process under production conditions, Z. Yang, S. Paolucci and M. Sen, ASME Winter Annual Meeting, New Orleans, Nov. 28–Dec. 3, 1993.
29. Effect of shear flow on Benard natural convection in a cavity, L. Del Castillo, E. Ramos, K.T. Yang and M. Sen, CAM94 Physics Meeting, XXXVII Congreso Nacional de Física, Cancún, Mexico, September 26–30, 1994.
30. Natural convection in a rotating cavity, L.M. De la Cruz, E. Ramos, M. Sen and K.T. Yang, CAM94 Physics Meeting, XXXVII Congreso Nacional de Física, Cancún, Mexico, September 26–30, 1994.
31. A novel pump for low-Reynolds number flows, D. Wajerski, A. Texier, M. Sen, and M. Gad-el-Hak, American Physical Society Fluid Dynamics Meeting, Bulletin of the American Physical Society, Vol. 40, p. 2041, 1995.
32. Navier-Stokes simulations of a novel viscous pump, M. Sen, M.C. Sharatchandra and M. Gad-el-Hak, American Physical Society Fluid Dynamics Meeting, Bulletin of the American Physical Society, Vol. 41, No. 9, pp. 1790–1791, 1996.
33. Thermal Aspects of a Micropumping Device, M.C. Sharatchandra, M. Sen and M. Gad-el-Hak, American Physical Society Fluid Dynamics Meeting, Bulletin of the American Physical Society, Vol. 41, No. 9, pp. 1791, 1996.
34. Exact solution of slip-flow in microbearings, M. Gad-el-Hak, J. Maureau and M. Sen, American Physical Society Fluid Dynamics Meeting, 1997.
35. Analysis of viscous micropumps and microturbines, D. DeCourtye, M. Sen and M. Gad-el-Hak, American Physical Society Fluid Dynamics Meeting, 1997.
36. Constrained shape optimization using genetic algorithms, M.C. Sharatchandra, M. Sen and M. Gad-el-Hak, American Physical Society Fluid Dynamics Meeting, 1997.
37. Effect of delay in heating and cooling systems, G. Díaz, S. Basu, M. Sen, K.T. Yang and R.L. McClain, Proceedings of the Eurotherm No. 53, Advanced Concepts and Techniques in Thermal Modelling, pp. 41–42, 1997.
38. The use of MEMS-based sensors for measuring wall-shear stress, P. Johansson, L. Löfdahl, M. Sen and M. Gad-el-Hak, American Physical Society Fluid Dynamics Meeting, 1998.
39. The use of MEMS-based sensors for measuring wall-shear stress, P. Johansson, L. Löfdahl, M. Sen and M. Gad-el-Hak, Proceedings of the Annual Swedish Days of Mechanics (Svenska Mekanikdaggar) 1999 (SMD-99), eds. H. Alfredsson, Paper No. 4.5.b, Swedish National Committee for Mechanics, 7–9 June, KTH Högskoletryckeriet, Stockholm, Sweden, 1999.
40. Artificial intelligence in heat transfer, K.T. Yang and M. Sen, Journal of Heat Transfer, Millennium Edition, 2000.
41. Modeling of thermal sensors for wall-shear stress, P. Johansson, A. Bakchinov, L. Löfdahl, M. Sen and M. Gad-el-Hak, American Physical Society Fluid Dynamics Meeting, Vol. 44, No. 8, p. 181, 1999.
42. Thermal sensors for wall-shear stress: Reality and Myth, L. Löfdahl, P. Johansson, A. Bakchinov, M. Sen and M. Gad-el-Hak, American Physical Society Fluid Dynamics Meeting, Bulletin of the APS, Vol. 44, No. 8, p. 181, 1999.
43. Simulation of heat exchanger performance by artificial neural networks, G. Díaz, M. Sen, K.T. Yang and R.L. McClain, ASHRAE Winter Meeting, Dallas, TX, Feb. 2000.
44. An analytical solution to the conjugate heat transfer problem of a thermal wall-shear-stress sensor, C.-F. Stein, Peter Johansson, J. Bergh, L. Löfdahl, M. Sen, M. Gad-el-Hak, American Physical Society Fluid Dynamics Meeting, 2000.

45. Reducibility, emergence and the mathematical modeling of complex systems, M. Sen, PanIIT Research Symposium, Chennai, India, Dec. 19–20, 2008.
46. A two-dimensional model of particle motion in ureteral peristaltic flow, J. Jiménez-Lozano, M. Sen, P.F. Dunn, ASME 2009 Summer Bioengineering Conference, Lake Tahoe, CA, June 2009.
47. Molecular Dynamic Study of Properties of Nanofluids: Thermodynamics, Gianluca Puliti, Samuel Paolucci and Mihir Sen, ASME-ATI-UIT Conference on Thermal and Environmental Issues in Energy Systems, May 16–19, 2010, Sorrento, Italy.
48. Molecular Dynamic Study of Properties of Nanofluids: Thermodynamics, Gianluca Puliti, Samuel Paolucci and Mihir Sen, 2010 Midwest Thermodynamics and Statistical Mechanics Conference, June 2–3, 2010, Notre Dame, IN.
49. Thermodynamic properties of nanofluids, Gianluca Puliti, Samuel Paolucci and Mihir Sen, *ASME International Mechanical Engineering Congress and Exposition*, Vancouver, BC, Canada, Nov. 12–18, 2010.

## Invited Lectures and Seminars

1. Numerical methods in fluid mechanics, Regional Technological Institute, Merida, Mexico, 1979.
2. Chaotic behavior in convective flows, Second School of Statistical Physics, Oaxtepec, Mexico, 1983.
3. One-dimensional analysis of thermosyphons, Mechanical Engineering Department, Indian Institute of Technology, New Delhi, India, July 1985.
4. One-dimensional modeling of natural convection loops, Seminar in Mechanics Series, Department of Civil Engineering, McGill University, Montreal, Canada, April 9, 1986.
5. Natural convection in a thin horizontal porous sennulus, Hydrodynamics Laboratory, Ecole Polytechnique, Montreal, Canada, April 10, 1986.
6. One-dimensional modeling of natural convection loops, Department of Mechanical Engineering, State University of New York, Stony Brook, NY, March 1986.
7. Some characteristics of unicellular convection, Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, Philadelphia, PA, Dec. 2, 1987.
8. Periodicity and bifurcation in boiling, Aug. 16, 1989, Solar Energy Laboratory, Temixco, Mexico.
9. Natural convection in rectangular cavities with the parallel flow approximation, Aug. 23, 1989, Solar Energy Laboratory, Temixco, Mexico.
10. Chaotic mixing for heat transfer enhancement and other applications, H.-C. Chang and M. Sen, Workshop on Applications of Chaos, EPRI Office of Exploratory Research, San Francisco, Dec. 1990.
11. Relation between theory and experimentation in Research, Oct. 23, 1992, Universidad Simon Bolivar, Caracas, Venezuela.
12. Chaotic advection and heat transfer, Dec. 3, 1992, Solar Energy Laboratory, Temixco, Mexico.
13. Stability of flow in a rotating open loop thermosyphon, Feb. 18, 1993, II Latin American Conference on Turbomachinery, Cuernavaca, Mexico.
14. Chaotic advection with heat transfer, invited keynote presentation, June 9, 1993, First International Thermal Energy Congress, Marrakesh, Morocco.
15. Chaotic particle paths and heat transfer in coiled tubes, June 11, 1993, Ecole Nationale d'Industrie Minerale, Rabat, Morocco.
16. Chaotic particle paths and heat transfer in internal flows, Seventh Toyota Conference 1/2 Towards the Harnessing of Chaos, Lake Hamana, Shizuoka, Japan, Toyota Motor Corporation, Nov. 3, 1993.
17. Thermoacoustic machines, invited keynote presentation, 5th Latin American Congress of Heat and Mass Transfer, Caracas, Venezuela, Oct. 24–27, 1994.
18. Chaos and heat transfer, participation by invitation, American Society of Mechanical Engineers, Winter Annual Meeting, Chicago, Nov. 6–11, 1994.
19. Effect of chaotic advection on heat transfer, Faculty of Mechanical, Electrical and Electronic Engineering, University of Guanajuato, Salamanca, Mexico, Aug. 22, 1994.
20. Application of chaos theory in heat transfer, as part of New Frontiers in Mechanical Engineering, Division of Graduate Studies, Faculty of Engineering, National University of Engineering, Mexico City, Mexico, Aug. 22–26, 1994.
21. Chaotic advection and heat transfer, invited panelist in Panel on Chaotic Heat Transfer, ASME International ME Congress and Exposition, Chicago, Nov. 7, 1994.

22. Application of artificial intelligence to thermal engineering, Institute Lecture, Indian Institute of Technology, Kanpur, May 10, 2000.
23. Transport processes in heat exchangers, Department of Mechanical Engineering, Indian Institute of Technology, Kanpur, May 24, 2000.
24. Chaos and complexity in convective heat transfer, Department of Thermo and Fluid Dynamics, Chalmers University of Technology, Göteborg, Sweden, 2001.
25. Thermal control, Department of Mechanical Engineering, Purdue University, Nov. 7, 2002.
26. The fractional derivative and some thermofluid applications, Center for Energy Research, Temixco, Mexico, Oct. 22, 2003.
27. The fractional derivative and some thermofluid applications, Universidad Autónoma de San Luis Potosí, San Luis Potosí, Mexico, Oct. 24, 2003.
28. Control of HVAC systems, March 13, 2007, Kuwait University, Kuwait.
29. Analysis and control of complex thermo-mechanical systems, March 18, 2007, Kuwait University, Kuwait.
30. Analysis of simple and complex systems, Universidad Autónoma de San Luis Potosí, San Luis Potosí, March 30, Mexico, 2007.
31. From the simple to the complex: An engineer's perspective, Distinguished Lecture Series, Virginia Commonwealth University, Richmond, VA, April 23, 2007.
32. (a) Mathematical modeling of simple and complex systems, (b) Intelligent systems in engineering, March 5, 2008, Universidad Autónoma de Querétaro, Querétaro, Mexico.
33. (a) Complex systems in thermal and mechanical engineering, July 1, 2011, (b) Synchronization in thermal and mechanical oscillations, July 4, 2011, Xi'an Jiao Tong University, Xi'an, China.
34. Complexity and synchronization in engineering systems, July 8, 2011, North China Electric Power University, Beijing, China.
35. (a) Complex systems in thermal and mechanical engineering, Sept. 15, 2011, Popular Lecture Series (b) Synchronization in thermal and mechanical oscillations, Sept. 21, 2011, Indian Institute of Technology, Gandhinagar, Gujarat, India.
36. (a) Complex systems in thermal and mechanical engineering, Sept. 29, 2011, (b) Synchronization in thermal and mechanical oscillations, Oct. 12, 2011, Golden Jubilee Lectures, National Institute of Technology, Calicut, Kerala, India.
37. (a) Dynamics of thermal interactions in buildings: theory, (b) Dynamics of thermal interactions in buildings: experiments, National Workshop on Energy Efficient Buildings, Oct. 14–15, 2011, National Institute of Technology, Calicut, Kerala, India.
38. Synchronization in thermal and mechanical oscillations, Oct. 28, 2011, Indian Institute of Technology, Madras, Tamilnadu, India.
39. (a) Complex systems in thermal and mechanical engineering, Nov. 17, 2011, (b) Synchronization in thermal and mechanical oscillations, Nov. 28, 2011, Central Mechanical Engineering Research Institute, Durgapur, West Bengal, India.
40. Synchronization in thermal and mechanical oscillations, Nov. 25, 2011, Indian Institute of Technology, Kharagpur, West Bengal, India.
41. Synchronization in thermal and mechanical oscillations, Dec. 8, 2011, Indian Institute of Technology, Delhi, India.
42. Synchronization of oscillators, Sept. 17, 2011, Facultad de Ingeniería, U.N.A.M., Mexico City, Mexico.
43. Keynote Plenary Lecture: Emergent phenomena in the thermal dynamics of buildings as complex systems, XV Congreso Chileno de Ingeniería Mecánica, Universidad de La Serena, Chile, Nov. 29, 2012.
44. Keynote Plenary Lecture: Fluid mechanics and heat transfer of electron flow in semiconductors, Congreso de la Sociedad Mexicana de Ingeniería Mecánica, Pachuca, Mexico, Sept. 27, 2013.
45. Renewable energy in mechanical engineering with emphasis on wind energy, Santiago, Chile, Fifth Week on Mechanical Engineering, University of Chile, Oct. 23, 2013.
46. Keynote Plenary Lecture: Dynamics of complex mechanical systems, VIII Congreso Latinoamericano de Ingeniería Mecánica, Cuenca, Ecuador, Nov. 27, 2014.

## Patents

1. Process and apparatus for enhancing in-tube heat transfer by chaotic mixing, M. Sen and H.-C. Chang, U.S. Patent No. 5,311,932, May 17, 1994.
2. Methods and apparatus for human motion controlled wearable refrigeration, F. Semperlotti and M. Sen, U.S. Patent No. 9,936,763, April 10, 2018.
3. Thermoacoustic device and method of making the same, F. Semperlotti, H. Hao, C. Scalo and M. Sen, U.S. Patent No. 11,375,320, June 28, 2022.

## Courses Taught at the University of Notre Dame

### *Undergraduate*

1. Differential Equations and Applied Mathematics
2. Thermal Systems
3. Fluid Mechanics
4. ME Senior Design Project
5. Compressible Flow
6. Heat Transfer
7. Food Processing Engineering
8. Fluid Mechanics Laboratory
9. Measurements Laboratory
10. Introduction to Engineering Systems I and II
11. Engineering Analysis
12. Energy Systems
13. Introduction to Energy Systems
14. Introduction to Numerical Methods

### *Graduate*

1. Mathematical Methods I
2. Introduction to Chaotic Dynamics
3. Intermediate Fluid Mechanics
4. Intermediate Heat Transfer
5. Intelligent Systems
6. Thermal Convection

## Courses Taught at Other Universities

### *Faculty of Engineering, National University of Mexico*

#### Undergraduate:

1. Mechanics of Fluids I
2. Mechanics of Fluids II
3. Mechanics of Fluids III
4. Elements of Fluid Mechanics
5. Dynamics of Fluids
6. Heat Transfer
7. Thermodynamics
8. Applied Thermodynamics

#### Graduate:

1. Mechanics of Ideal Fluids
2. Mechanics of Viscous Fluids

3. Experimental Methods
4. Random Phenomena in Fluid Mechanics
5. Hydrodynamic Instability and Turbulence
6. Fundamentals of Fluid Mechanics
7. Advanced Topics in Fluid Mechanics
8. Geophysical Flows
9. Experimental Methods in Fluid Mechanics
10. Numerical and Approximate Methods in Fluid Mechanics
11. Advanced Topics in Heat Transfer
12. Two-Phase Heat Transfer

*Cornell University*

Undergraduate

1. Senior Mechanical Engineering Laboratory

### **Master's Theses Supervised**

1. Non-Linear Interaction between Shallow Water Waves, J.L. Samaniego, 1978.
2. Analysis of the Transient Behavior of a Thermosyphon, J.A. Rojas, 1980.
3. Characteristics of Circular Jets, E. Rincón, 1981.
4. Approximate Stability Analysis for a Cylindrical Falling Film, F.J. Solorio, 1982.
5. Numerical Solution of Natural Convection in Cavities, S.L. Moya, 1983.
6. Natural Convection in Semi-Elliptical Cavity, E. Martín del Campo, 1984.
7. Flow in Conjugate Thermosyphon Loops, O. Salazar, 1984.
8. Maximum Cyclonic Wind Speeds, J. Sánchez-Sesma, 1985.
9. Starting Characteristics of Round Jets, J. Hernández, 1987.
10. Natural Convection in a Tilted Trapezoidal Enclosure, V. Kumar, 1987.
11. Deterministic Chaos in Nucleate Boiling, N. Acharya, 1989.
12. Analysis of Flow over Fixed and Rotatable Cylinder-Splitter Plate Body (Co-Director), J.C. Xu, 1990.
13. Experimental and Numerical Investigation of Flow Past a Freely Rotatable Square Cylinder (Co-Director), T.G. Zaki, 1991.
14. A Two-Dimensional Model for an Evaporative Falling Film with Deposition (Co-Director), M. Núñez, 1994.
15. Analytical and Numerical Study of Solidification by Convective Cooling with Void Formation, Z. Yang, 1994.
16. Performance of a Single-Row Heat Exchanger at Low In-Tube Flow Rates (Co-Director), X. Zhao, 1995.
17. Development of Computational Algorithms for Forced and Mixed Convection in Coiled Tubes in a Fin-Tube Heat Exchanger (Co-Director), Q. Shi, 1997.
18. Dynamic Modeling and Thermal Control of Multi-Room Cooling, Z. Xiao, 1999.

### **Doctoral Dissertations Supervised**

1. Ignition Processes of Premixed Gases in Boundary Layer Flows, César Treviño, 1980.
2. Linear Stability of a Cylindrical Falling Film of Liquid: Theoretical and Experimental Study, Francisco J. Solorio, 1989.
3. Experimental and Numerical Investigation of Heat Transfer Enhancement by Chaotic Mixing, Narasimha Acharya, 1992.
4. Mathematical Modeling of Thermocompressive and Thermoacoustic Machines (Co-Director), Driss Omari, 1996.
5. Heat Transfer Enhancement by Regular and Chaotic Mixing in Laminar Channel Flow, David R. Sawyers, 1997.

6. Study of External Heat Transfer Mechanisms in Single-Row Fin and Tube Heat Exchangers, Ricardo Romero-Méndez, 1998.
7. Simulation and Control of Heat Exchangers using Artificial Neural Networks, Gerardo Díaz, 2000.
8. Simulation of Compact Heat Exchangers using Global Regression and Soft Computing, Arturo Pacheco-Vega, 2002.
9. Temperature Controllability in Cross-Flow Heat Exchangers and Long Ducts, Sorour Alotaibi, 2003.
10. Hydrodynamics and Control in Thermal-Fluid Networks, Walfre Franco, 2003.
11. Nonlinear Dynamics of Thermal-Hydraulic Networks, Weihua Cai, 2006.
12. Linear Stability of Electron-Flow Hydrodynamics in Ungated Semiconductors, Williams Calderón Muñoz, 2009.
13. Peristaltic Flow with Application to Ureteral Biomechanics, Joel Jiménez Lozano, 2009.
14. A Heat Conduction Study at Non-Continuum Scales (Co-Director), Alejandro Guajardo Cuéllar, 2011.
15. Reduction and Approximation in Large and Infinite Potential-Driven Flow Networks, Jason Mayes, 2012.
16. Thermal Study of a GaN-Based HEMT, Jorge Ferrer-Pérez, 2012.