



## Biographical Sketch

### Professor Renato Machado Cotta

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Full Professor  
Polytechnic School & COPPE/UFRJ  
Federal University of Rio de Janeiro

Senior Technical Consultant  
General Directorate of Nuclear and  
Technological Development – DGDNTM  
Brazilian Navy, Amazul S.A.

**September 2022**

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### PERSONAL DATA

Born March 5<sup>th</sup> 1960, in Niterói, Rio de Janeiro, Brasil. Son of Enéas Machado Cotta and Claudette de Oliveira Cotta, both from Niterói, Brasil. Father of Bianca Pires Cotta, born in April 24<sup>th</sup>, 1984, in Rio de Janeiro, Brasil, Clara Naveira Cotta, born in February 12<sup>th</sup>, 2010, in Niteroi, Brasil, Gabriel Naveira Cotta, born in October 23<sup>rd</sup>, 2011, in Niteroi, Brasil, and step-father of Victor Naveira Figueiredo, born in December 12<sup>th</sup>, 2002, in Rio de Janeiro, Brasil. Married to Carolina Palma Naveira Cotta, born in March 31<sup>st</sup>, 1981.

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### EDUCATION

1. B.Sc. – Mechanical Engineering (specialization in Nuclear Engineering) - Federal University of Rio de Janeiro (1977-1981). Final graduation project advised by Professor Nilson Roberty on thermal analysis of nuclear fuel rods for PWR reactors.
2. On Job Training – Nuclear Engineering Institute, IEN/CNEN (1980-1981). Research, design and operational training on nuclear reactors thermohydraulics at the water and liquid sodium circuits, advised by Prof. Sergio V. Moller.
3. Ph.D. - Mechanical & Aerospace Engineering - North Carolina State University, Raleigh, USA (1982-1985). Minors in Nuclear Engineering and Mathematics. The thesis work was advised by Prof M. Necati Ozisik and was centered on analytical and hybrid solutions for internal convective heat transfer in the three time regimen - steady, periodic and transient. Scholarship sponsored by CNEN/Brazil.

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## ACADEMIC/ PROFESSIONAL EXPERIENCE

### Permanent Positions

1. 1984-1985 – Research Assistant, Mechanical & Aerospace Engineering Department, North Carolina State University, USA.
2. 1984-1985 – Teaching Assistant, Physics Department, North Carolina State University, USA.
3. 1986-1987 - Assistant Professor, Mechanical-Aeronautical Engineering Department, Air Force Institute of Technology, ITA/CTA, São José dos Campos, São Paulo, Brasil.
4. 1987 (Aug.-Dec.) – Resident Consultant – Navy Technology Center (COPESP, CTMSP, Brazilian Navy)
5. 1988-1994 - Associate Professor - Mechanical Engineering Department, PEM/COPPE (up to 1994) & DEM/POLI (up to 1997), Universidade Federal do Rio de Janeiro, UFRJ.
6. 1993-2005 - Adjunct Professor - Mechanical Engineering Dept., University of Miami, Coral Gables, FL, USA.
7. 1994 – Present: Full Professor - Mechanical Engineering Department, PEM/COPPE (1994-Present) & DEM/POLI (1997- Present), UFRJ.
8. 2013 – 2017: Full Professor - Nanoengineering Department, COPPE/UFRJ.
9. 2014 – 2017: Full Professor - Interdisciplinary Nucleus for Social Development, NIDES/UFRJ.
10. 2017 (Aug.-Dec.) and Feb. 2019-Present - Senior Technical Consultant, General Directorate for Nuclear Development and Technology, DGDNTM, Brazilian Navy, AMAZUL S.A., Ministry of Defense.

### Visiting Professor/Researcher Positions

11. 1987-2000 – Visiting Consultant – Navy Technology Center (CTMSP, Brazilian Navy)
12. 1989 (Jan.-Feb.) – Visiting Professor – Mechanical & Aerospace Eng. Dept., University of Miami, USA.
13. 1989 (Aug.-Sept.) – Visiting Professor – Applied Mathematics Center, Sofia, Bulgaria.
14. 1992 (Jun.-Jul.) – Visiting Professor – Laboratorio di Ingegneria Nucleare di Montecuccolino, Università Degli Studi di Bologna, Italy.
15. 1999 (Jun.-Aug.) – Visiting Professor – Energy Resources Center, University of Illinois at Chicago, USA
16. 2002 (Jan.-Mar.) – Visiting Researcher – Tetra Tech Inc., R&D Office, CA, USA
17. 2004 (Jan.-Mar.) – Professeur Invité – Laboratoire de Thermomécanique, Université de Reims, Champagne-Ardennes, France
18. 2006 (Jan.-Mar.) – Professeur Invité – Laboratoire de Thermomécanique, Université de Reims, Champagne-Ardennes, France
19. 2008 (Jan.-Mar.) – Professeur Invité – Laboratoire de Thermomécanique, Université de Reims, Champagne-Ardennes, France
20. 2014 (Jun.-Jul.) – Visiting Professor – Harriot-Watt University, Scotland, UK.
21. 2017 (Dec.) – 2018 (Dec.) – Visiting Professor – Mechanical Eng. Dept., University College London, UCL, UK (Leverhulme Trust Visiting Professorship).

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## ADMINISTRATION AND REPRESENTATION

### External

1. Member of the National Council for Energy Policy (CNPE), Ministry of Mines and Energy, MME, Brasil, 2020-2022. CNPE, chaired by the Minister of State for Mines and Energy, is an advisory body to the President of the Republic for the formulation of energy policies and guidelines, formed by 14 members, including 10 State Ministries and 1 representative of the Brazilian Academia, specialist in energy matters. <https://www.gov.br/mme/pt-br/assuntos/conselhos-e-comites/cnpe/composicao-do-cnpe>
2. Member of the Technical Working Group on Nuclear Desalination (TWG-ND), International Atomic Energy Agency (IAEA), Vienna, Austria, 2021-2024.
3. President, National Commission of Nuclear Energy (CNEN), nominated by the Ministry of Science, Technology & Innovation, Brazil, November 2015 - March 2017. CNEN is the regulatory agency in nuclear energy in Brazil, as well as a research consortium comprising 14 units, including 6 research institutes, and around 2200 employees. ([www.cnen.gov.br](http://www.cnen.gov.br))
4. Executive Director, Brazilian Academy of Sciences (ABC), responsible for administrative affairs of the Academy, supporting the proposition and organization of scientific meetings and events, March 2012 – November 2015. ([www.abc.org.br](http://www.abc.org.br))
5. President of the Administration Council of INB, Indústrias Nucleares do Brasil, MCTI, Rio de Janeiro, Brazil, 2015-2017. ([www.inb.gov.br](http://www.inb.gov.br))
6. President of the Administration Council of NUCLEP, Nuclebrás Equipamentos Pesados S.A., MCTI, Rio de Janeiro, Brazil, 2015-2017. ([www.nuclep.gov.br](http://www.nuclep.gov.br))
7. Member of the Executive Committee of the Infrastructure Fund (CT-Infra) of the Ministry of Science, Technology and Innovation, MCTI, Brazil, 2012-2015.
8. Member of the Superior Council of FINEP, technology and innovation sponsoring agency of the Ministry of Science, Technology and Innovation, MCTI, Brazil, 2013-2015. ([www.finep.gov.br](http://www.finep.gov.br))
9. President (Elected by members), Brazilian Society of Mechanical Sciences and Engineering, ABCM, 2000 & 2001. ABCM is a national scientific association responsible for the organization of major national and international scientific meetings within the country, as well as for the publication of the International Journal of Mechanical Sciences, Transactions of ABCM ([www.abcm.org.br](http://www.abcm.org.br)).
10. Member and Secretary, Thermal Sciences Committee, Brazilian Society of Mechanical Sciences and Engineering, ABCM, 1986-92.
11. Member and Secretary, Nuclear Engineering Committee, Brazilian Society of Mechanical Sciences and Engineering, ABCM, 2019-present.
12. Brazilian Delegate, Assembly for International Heat Transfer Conferences (AIHTC), 1992-2000.
13. Member and Coordinator, Consultants Committee (Engineering II), CNPq, 1994-1997, re-elected in 2007-2010. CNPq is the federal research sponsoring agency in Brazil, subjected to the Ministry of Science and Technology.
14. Member, Consultants Committee (Engineering III), CAPES, 1991-1994, re-elected in 1995-1998. CAPES is the federal research sponsoring agency and graduate programs evaluator in Brazil, subjected to the Ministry of Education.

15. Member, Special Commission for Evaluation of the National Postgraduate Program, CAPES, Ministry of Education, March-August, 2019.
16. Elected Member, Executive Committee of the International Center for Heat and Mass Transfer, ICHMT, Turkey, since 2006.
17. Elected Vice-Chairman, Executive Committee of the International Center for Heat and Mass Transfer, ICHMT, Turkey, 2016 and 2019. (<https://www.ichmt.org/p/officers-of-ichmt>)
18. Elected Chairman, Executive Committee of the International Center for Heat and Mass Transfer, ICHMT, Turkey, 2017-2018.
19. Member of the Superior Council of the Brazilian Space Agency (Alternate), AEB, since 2014. ([www.aeb.gov.br](http://www.aeb.gov.br))
20. Member of the Scientific Committee of the Brazilian Nanotechnology National Laboratory, LNNano, CNPEM, Campinas, SP, 2015.

#### **At UFRJ**

1. Coordinator for Research and Graduate Studies, Dean's Office, Technology Center, Federal University of Rio de Janeiro, CT-UFRJ, January 2012-July 2014. ([www.ct.ufrj.br](http://www.ct.ufrj.br))
2. Member of Institutional Committee for the Project "Museu Nacional Vive", responsible for re-erecting the National Museum (UFRJ), nominated by the Brazilian Academy of Sciences, ABC, 2020.
3. Graduate Coordinator, Mechanical Eng. Program, Universidade Federal do Rio de Janeiro, COPPE/UFRJ, 1991/93, 1998, 2000/2001 ( [www.mecanica.coppe.ufrj.br](http://www.mecanica.coppe.ufrj.br)).
4. Coordinator of International Cooperation, NIDES, Interdisciplinary Nucleus for Social Development, Technology Center, Federal University of Rio de Janeiro, CT-UFRJ, December 2014-November 2015. ([www.nides.ufrj.br](http://www.nides.ufrj.br))
5. Head of the Heat Transmission & Technology Laboratory, LTTC, PEM/COPPE, 1993-1998, 2006-2012.
6. Founder and Head of the *Mathematica* Technical Center, MTC, Wolfram Research/COPPE, 1999-2003. MTC is an academic initiative co-sponsored by WRI, makers of the platform *Mathematica*, and based at COPPE/UFRJ.
7. Founder and Head of the Center for Analysis and Simulations on Environmental Engineering, CASEE, an international consortium composed of EPRI/USA (Electric Power Research Institute), Tetra Tech/USA (Environmental Engineering Consulting Co.), and COPPE/UFRJ, Brasil, since 2001. CASEE is an international agreement, among the three institutions, designed to bring together a research center, a major consulting company, and a locally based University, towards the merging of experiences in simulation of environmental problems due mainly to energy generation within Brasil (name changed to CASEE – Center for Analysis of Sustainable Energies and the Environment, in 2011).
8. Founder and Head of the Thermal Metrology Unit Prof. Roberto de Souza, UNIMET, of COPPE/UFRJ, 2002-2012. This academic unit of COPPE is responsible for services of temperature and pressure sensors calibration, as well as thermal properties determination research and consulting.

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## CONSULTING EXPERIENCE

1. Research Consultant & Coordinator, IAE/CTA and AEB (Aerospace Technical Center & Brazilian Space Agency), since 1988. Four long-term research projects were contracted with the COPPETEC Foundation (UFRJ), for the aerothermodynamic and thermal protection analysis of space vehicles, including the thermal design of the SARA satellite for atmospheric reentry.
2. Research Consultant & Coordinator, CTM-SP (Navy Research Center, Brasil), since 1986. Three long-term research projects were established with COPPETEC towards the simulation and optimization of flow and isotopes separation in ultracentrifuges for uranium enrichment.
3. Research Consultant & Coordinator, National Commission of Nuclear Energy (CNEN, Brasil), since 1989. Five long-term projects were established with COPPETEC for the safety analysis of surface repositories for nuclear waste, including the analysis of accidental dispersion of radionuclides in the biosphere.
4. Research Consultant, "Fast Refueling of Natural Gas Vehicles", RENAULT Plateau de Recherche, Renault-France/COPPE, (Coord. Prof. Helcio Orlande), 2000-2002.
5. Research Consultant & Coordinator, Research & Development Center, CENPES/Petrobras, 2005. A project was established with COPPETEC for the thermal analysis of pipe-in-pipe insulation systems with active heating for ultra-deep petroleum exploration.
6. Research Consultant & Coordinator, Research & Development Center, CENPES/Petrobras, since 2006. Two projects were conducted through the COPPETEC Foundation, for the characterization and convection simulation of nanofluids for the utilization in the heat transfer enhancement of energy generation processes.
7. Research Consultant & Coordinator, Indústrias Nucleares do Brasil (INB, Brasil), since 2005. Three projects were concluded through COPPETEC for the safety assessment of the waste from uranium mining and milling, including the analysis of long-term dispersion of radionuclides in the geosphere and their impact on the biosphere, originated from the liquid waste ponds, from the solid waste repository and from the uranium leaching platform.
8. Coordinator, Design and Construction of Icing Wind Tunnel and Thermal Control of Aeronautical Velocity Sensors, FAPERJ and ATS4I, 2010-2015.
9. Research Consultant & Coordinator, Eletronuclear, Brasil, since 2013. One project concluded through COPPETEC for the design of passive cooling systems for the short (wet) term storage of spent nuclear fuel assemblies.
10. Research Consultant & Coordinator, Tenaris-CONFAB, Brasil, since 2013. One project concluded through COPPETEC for the design of a high pressure and low temperature facility for research on insulation systems for ultra-deep petroleum production.
11. Technical Consultant, Amazul S.A. and General Directorate for Nuclear and Technological Development, DGDNTM, Brazilian Navy, 2017. Collaboration in the creation of the Naval Agency for Nuclear Safety and Quality, and technical evaluation in the development of the Nuclear-electrical Generation Laboratory (LABGENE).
12. Technical Coordinator, Design and testing of desalination unit with direct contact membrane distillation with solar energy and waste heat recovery (Aqua Vitae &

DESSAL Projects), IPqM/Brazilian Navy, COPPE/UFRJ, CNEN, sponsored by PROCAD-DEFESA, FAPERJ, and CNPq, 2017-present.

13. Research Consultant, Research and Development of Micro Channel Heat Sinks for High Concentration Photovoltaic Cells with Recovery of Rejected Heat for Desalination, ANP Project, Petrogal Brasil S.A., COPPE/UFRJ (Coord. Profa. Carolina Cotta), 2020-present. Three years project through COPPETEC for the design and demonstration of active cooling of HCPV panels with waste heat recovery in direct contact membrane distillation.
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## BOOKS

1. R.M. Cotta, Calpak-Computational Laboratory in Heat Transfer, Núcleo de Publicações, COPPE/UFRJ, 1988 (in Portuguese).
  2. R.M. Cotta, Integral Transforms in Computational Heat and Fluid Flow, CRC Press, Boca Raton, USA, 1993. ISBN: 0849386659; eBook ISBN 9781003069065; doi: 10.1201/9781003069065
  3. R.M. Cotta & M.D. Mikhailov, Heat Conduction:- Lumped Analysis, Integral Transforms, Symbolic Computation, Wiley-Interscience, N.Y., 1997. ISBN: 0471956481
  4. R.M. Cotta, The Integral Transform Method in Thermal-Fluid Sciences and Engineering, Begell House Inc., N.Y., 1998. ISBN: 1567001203
  5. R.M. Cotta, L.S.B. Alves, and M.D. Mikhailov, Applied Numerical Analysis with Mathematica, MTC/WRI, Editora E-papers, 2001. ISBN: 858792222X
  6. H.R.B. Orlande, O. Fudym, D. Maillet, and R.M. Cotta, Eds., "Thermal Measurements and Inverse Techniques", CRC Press, 2011. ISBN: 978-1-439-84555-4
  7. R.M. Cotta, D.C. Knupp, and C.P. Naveira-Cotta, "Analytical Heat and Fluid Flow in Microchannels and Microsystems", Mechanical Eng. Series, Springer-Verlag, 2016. ISBN: 978-3-319-23311-6
  8. M. Rebay, S. Kakaç, and R.M. Cotta, Eds., "Microscale and Nanoscale Convective Heat Transfer: Concepts, Analysis, and Applications", CRC Press, Boca Raton, FL, 2016. ISBN: 978-1-498-73630-5
  9. M.N. Ozisik, H.R.B. Orlande, M.J. Colaço, and R.M. Cotta, "Finite Difference Methods in Heat Transfer", 2nd Edition, CRC Press, Boca Raton, FL, 2017. ISBN: 978-1-4822-4345-1
  10. R.M. Cotta (Co-Editor), "Handbook of Thermal Science and Engineering", Section I - Heat Transfer Fundamentals, Francis A. Kulacki et al., Eds., vols.1-4, Springer, 2017. ISBN:978-3-319-26694-7
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## RESEARCH PROJECTS AND PUBLICATIONS

1. More than 580 documents in major journals, refereed conferences, books and chapters (full list found in ORCID <http://orcid.org/0000-0003-0965-0811>; CV Lattes: <http://lattes.cnpq.br/2974805638656106> )
2. Supervisor of 38 Ph.D. (36 completed, 2 in progress), 49M.Sc. (48 completed, 1 in progress), and 17 Posdoc's (1 in progress).

3. Coordinator or Co-Principal Investigator, Sponsored Research Projects and Scholarship Programs (CNPq, FAPERJ, FINEP, PRONEX, FUJB, FAPESP, COPEP II, CENPES/Petrobras, INB, Eletronuclear, Tenaris/CONFAB, AEB, CTPETRO, ANP, British Council, NSF/CNPq, CAPES/COFECUB-France, CNPq/CNRS-France, CSF/CNPq, UK Newton Fund/CONFAP, INMETRO/CAPES, Leverhulme Trust - UK, CTMSP/Brazilian Navy, PROCAD-Defesa/CAPES, RAEng - Royal Academy of Engineering, PETROGAL, CNRS/LAAS, since 1986.
  4. Patent No. INPI: BR 102019.001325-7, filed 23/01/2019, "Monolithic Microfluidic Device for Optimization of Chemical Reactions Not Involving Reagents or Solid Products", 2019.
  5. Registered Software No. INPI 27100130790, UNIT 1D-M, Unified Integral Transforms, 2010
  6. **Citations** – September 16<sup>th</sup>, 2022:
    - 11,160 citations in Google Scholar with h-index 51 ([https://scholar.google.com/citations?hl=en&user=fdTa1UYAAAAAJ&view\\_op=list\\_works](https://scholar.google.com/citations?hl=en&user=fdTa1UYAAAAAJ&view_op=list_works));
    - 4,551 citations in Scopus with h-index 36 in 258 papers at Scopus Author ID: 7005409712;
    - 3,446 citations in Web of Science with h-index 31 in 239 papers and total of 580 documents at Researcher ID H-5336-2012.
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## DISTINCTIONS AND AWARDS

1. Doctor Honoris Causa, Université de Reims Champagne-Ardenne, URCA, France, 2018. (<https://www.univ-reims.fr>)
2. Member – The World Academy of Sciences, TWAS, Trieste, Italy, since 2012 ([www.twas.org](http://www.twas.org)).
3. Member - Brazilian Academy of Sciences, ABC, Area: Engineering Sciences, since 2009. ([www.abc.org.br](http://www.abc.org.br))
4. Member - National Academy of Engineering, ANE, Brazil, since 2011. ([www.ane.org.br](http://www.ane.org.br))
5. Leverhulme Visiting Professorship – University College London, UK, 2017-2018. (<https://www.leverhulme.ac.uk/visiting-professorships>)
6. Fellowship Award, International Center for Heat and Mass Transfer, ICHMT, 2018. (<https://www.ichmt.org/p/fellowship-award>)
7. Tier 1 Exceptional Talent Visa, UK Home Office, nominated by Royal Academy of Engineering, RAEng, 2017.
8. Member of the National Order of the Scientific Merit, Class Grã-Cruz, Presidência da República, Brazil, 2018.
9. Member of the National Order of the Naval Merit, Class Comendador, Presidência da República, Brazil, 2018.
10. Member of the National Order of the Scientific Merit, Class: Comendador, Presidência da República, Brazil, 2009.
11. Listed by PLOS Biology Journal among the 100 thousand most influential scientists in the world (top 2%) for citations along career (from a total of 600 scientists in Brazilian institutions). Announced and celebrated at the University Council special session for 100 years of the Federal University of Rio de Janeiro, 2020.
12. Medal “Carneiro Fellipe”, National Commission of Nuclear Energy, CNEN, 2018.

13. Medal "Mérito Tamandaré", Brazilian Navy, Ministry of Defense, Brazil, 2016.
14. Member, Scientific Council of the International Center for Heat and Mass Transfer, ICHMT, Turkey, since 1993. (<https://www.ichmt.org/p/scientific-council>)
15. Hartnett-Irvine Award - International Center for Heat and Mass Transfer, ICHMT (best paper in 2015, Cotta, R.M., K.M. Lisboa, J.R.B. de Souza, A.A. Bigdoli, J.B.R. Loureiro, C.P. Naveira-Cotta, and A.P. Silva Freire, "Experimental-Theoretical Analysis of Conjugated Heat Transfer in Aeronautical Sensors and Structures with Anti-Icing Systems", awarded at CHT-17, Napoli, Italy, 2017. (<https://www.ichmt.org/p/hartnett-irvine-award>)
16. Hartnett-Irvine Award - International Center for Heat and Mass Transfer, ICHMT (best paper in 2009, J. Nunes, R. Cotta, M. Avelino, S. Kakac, "Conjugated Heat Transfer in Microchannels", awarded at 14th IHTC, Washington, DC, 2010. (<https://www.ichmt.org/p/hartnett-irvine-award>)
17. Elected Member of Congress Committee - IUTAM, International Union of Theoretical and Applied Mechanics, 2010-2018 (two mandates). ([www.iutam.org](http://www.iutam.org))
18. Outstanding Research Award, COPPE/UFRJ, 1999 (second year of this award).
19. Medal "Amigo da Marinha", Brazilian Navy, Ministry of Defense, Brazil, 2016.
20. Award "Honra ao Mérito", Navy Engineers Corps, Brazilian Navy, Ministry of Defense, Brazil, 2017.
21. Award "Submarinista Emérito", Submarines Force, Brazilian Navy, Ministry of Defense, Brazil, 2017.
22. FAPERJ (State of Rio de Janeiro Scientific Award) - Cientista do Nosso Estado, since 1999.
23. Highly Commended Award Winner at the Literati Network Awards for Excellence 2008, article Gondim, R.R., E.N. Macedo, and R.M. Cotta, "Hybrid Solution for Transient Internal Convection with Axial Diffusion: Integral Transforms with Local Instantaneous Filtering", Int. J. Num. Meth. Heat & Fluid Flow, V.17, no.4, pp.405-417, 2007.
24. Highly Commended Award Winner at the Literati Network Awards for Excellence 2012, article Silva, R.L., C.A.C. Santos, J.N.N. Quaresma, and R.M. Cotta, "Integral Transforms Solution for Flow Development in Wavy-Wall Ducts", Int. J. Num. Meth. Heat & Fluid Flow, Vol. 21, no. 2, pp. 219-243, 2011.
25. "Highly Commended Award of the 2013/14 Emerald Engineering Outstanding Doctoral Research Award", Co-advisor, Dr. Diego Campos Knupp, 2014.
26. CAPES Thesis Prize (Co-Advisor) - Best DSc Engineering Thesis in Brazil, 2009 (Author: Carolina Palma Naveira Cotta).
27. CAPES Thesis Award - (Co-Advisor) - Menção Honrosa DSc Engineering Thesis in Brazil, 2013 (Author: Diego Campos Knupp).
28. ABCM-EMBRAER Thesis Prize (Co-Advisor) - Best MSc Mechanical Eng. Thesis in Brazil, 2010 (Author: Diego Campos Knupp).
29. ABCM-EMBRAER Prize (Advisor) - Best Graduation Project - Mechanical Eng. in Brazil, 2013 (Author: Kleber Marques Lisboa).
30. 2nd Oscar Niemeyer Prize (Co-advisor) - CREA/RJ - Best Graduation Project - Mechanical Eng., 2012 (Author: João Vitor Cabral Ayres)
31. Distinguished Professor, Student Body, Politechnic School, POLI/UFRJ (1990-1991, every year from 1993 to 2012, and 2016). Elected Paraninfo in 2003-1, 2003-2, 2005-2, 2010, 2012, 2016, and Patrono in 2009, 2010, 2011.
32. Research Fellowship. CNPq/Brasil (highest rank – Pesquisador 1A), since 1992.
33. Elected member, National Honor Society of Phi Kappa Phi, USA (1984).
34. STEP Award for Academic Excellence, ASME, USA (1984).



35. Who's Who in Science and Engineering (since 1997), Who's Who in the World (since 2000).
  36. Handbook of Thermal Science and Engineering, "Top ten most downloaded books", Engineering - Springer, 2019.
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## **EDITORIAL EXPERIENCE**

1. Founder and Editor-in-Chief, international journal "Hybrid Methods in Engineering", Begell House Inc., NY (up to Vol.4, no.4), co-edited by Mikhail D. Mikhailov.
  2. Regional Editor, International Journal of Thermophysical Properties Research (ex-High Temperatures, High Pressures), 2007-2017.
  3. Associate Editor, Engineering Sciences, Annals of the Brazilian Academy of Sciences (AABC), since 2013.
  4. Honorary Editorial Board, Int. Journal of Heat & Mass Transfer, since 1992.
  5. Honorary Editorial Board, Int. Communications in Heat and Mass Transfer, since 1992.
  6. Honorary Editorial Board, International Journal of Thermal Sciences, since 2000.
  7. Honorary Editorial Board, International Journal for Numerical Methods in Heat and Fluid Flow, since 2001.
  8. Honorary Editorial Board, Computational Thermal Sciences, since 2007.
  9. Honorary Editorial Board, Waste and Biomass Valorization, since 2009.
  10. Honorary Editorial Board, International Journal of Thermophysical Properties Research (ex- High Temperatures, High Pressures), since 2007
  11. Honorary Editorial Board, Journal of the Brazilian Society of Mechanical Sciences, 1989-1992, 2000-2004.
  12. Editorial Committee, Journal of Aerospace Technology and Management, JATM, 2012-2016.
  13. Int. Editorial Board, Journal of Heat and Mass Transfer Research, since 2018.
  14. Int. Editorial Board, Journal of Computational Applied Mechanics, since 2019.
  15. Editorial Advisory Board, Advances in Heat Transfer Series, Computational Mechanics Publications, CMP, UK, since 1994.
  16. Editorial Advisory Board, Mechanical Engineering Series, Springer, since 2016.
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## **INTERNATIONAL COLLABORATION**

1. Visiting Scholar, University of Miami, USA (1989, 1994, 1996, 1998, 2001, 2002), Applied Mathematics Centre, Sofia, Bulgaria (1989), Università Degli Studi di Bologna, Italy (1992), University College of Swansea, UK (1992, 1994), Tetra Tech, Inc., Lafayette, CA, USA (2002), University of Illinois at Chicago, UIC (1999, 2001), Laboratoire FAST, Orsay, France (2004), Université de Reims, France (2004, 2006, 2008), Harriot-Watt University, Scotland, UK (2014), University College London, UK (2018). This list includes only those technical visits of two weeks or longer.
2. International Cooperation Program, CNPq, "Automatic Solvers for Convection-Diffusion Problems Via Integral Transforms", Prof. Mikhail D. Mikhailov (Mathematical Technical Center, Sofia, Bulgaria), 1990.

3. International Cooperation Project, “Covalidation of the Integral Transform and Finite Elements Methods in Thermal and Fluid Sciences”, British Council Link: COPPE/UFRJ – Univ. College of Swansea, with Prof. Roland Lewis, 1992-1995.
4. International Cooperation Project, “USA-Brazil Workshop on Thermal Sciences Research”, CNPq/NSF (International Cooperation COPPE/MUEC, Midwest Universities Energy Consortium, USA), with Prof. James P. Hartnett, 1993-1994.
5. International Cooperation Project, CNPq, “Mixed Computation in Engineering:- The Integral Transform Method with Mathematica”, Prof. Mikhail D. Mikhailov (Visiting Researcher Scholarship), 1995-1999.
6. International Cooperation Project, “Theoretical and Experimental Research on Transient Forced Convection with Application to Cooling of Electronic Equipment”, CNPq/NSF (UFRJ/UFPB/University of Miami), with Prof. Sadik Kakaç, 1996-2001.
7. International Cooperation Project, “Covalidation of the Integral Transform and Finite Volume Methods in Heat Transfer”, Projeto CAPES-COFECUB, COPPE/UFRJ – Laboratoire FAST, Orsay, France, with Prof. Dominique Gobin, 1999-2002.
8. International Cooperation Program, “Mathematica Technical Center – MTC”, COPPE/UFRJ and Wolfram Research Inc., USA, International Agreement, 1999-2003.
9. International Cooperation Program, “Center for Analysis and Simulation in Environmental Engineering - CASEE”, COPPE/UFRJ, EPRI and Tetra Tech Inc., USA, 2001-2004.
10. International Network Project, CNPq/PROSUL - Programa Sul-Americano de Apoio às Atividades de Cooperação em Ciência e Tecnologia, Projeto de Cooperação Sul-Americana em Identificação de Propriedades Físicas em Transferência de Calor e Massa (Coord. Prof. Helcio R.B. Orlande), 2005-2011.
11. International Cooperation Project, Thermal image processing methods for microscale characterization, Projeto CNPq-CNRS (coord. Prof. Helcio Orlande), COPPE/UFRJ – ENSAM/Bordeaux and École des Mines d’Albi, France, with Prof. Jean Christophe Batsale and Prof. Olivier Fudym, 2006-2010.
12. International Mobility Project – CNPq/APV, Integral Transforms and Infrared Camera Thermography in Thermal Micro-systems and Conjugated Problems, with Prof. Mourad Rebay, Université de Reims, France, 2010.
13. International Cooperation Project, CNPq & CAPES/DRI/CGCI, Reactive Mass Transport in Soils and Aquifers: Environmental Impact Evaluation of Mineral Industry Waste and its Reuse, with Prof. Martinus van Genuchten, USDA Salinity Laboratory, CA, USA, 2010-2014.
14. International Cooperation Project, Micro-channel heat sinks for high concentration photovoltaics with reuse of the recovered heat for desalination, FAPERJ (coord. Prof. Renato Cotta), COPPE/UFRJ – ETH Zurich, Switzerland, with Prof. Dimos Poulidakos, 2012-2016.
15. International Mobility Project – CNPq/APV, Heat Flux Estimation in Transient Conjugated Problems, with Prof. Jacques Padet, Université de Reims, France, 2013.
16. International Cooperation Project, RCUK-CONFAP/FAPERJ, UK Newton Fund, Integrating water cooled concentrated photovoltaics with waste heat reuse to address the challenges in energy, environment, food and water nexus, University College London, UK & COPPE/UFRJ, with Prof. Stavroula Balabani, 2015-2017. <https://gtr.ukri.org/projects?ref=EP%2fM029573%2f1&pn=4&fetchSize=10&selectedSortableField=firstAuthorName&selectedSortOrder=ASC#/tabOverview>

17. International Cooperation Project, Micro and Nanoengineering in Sustainable Energies, CSF/CNPq (coord. Prof. Renato Cotta), COPPE/UFRJ – ETH Zurich, Switzerland, com Prof. Dimos Poulikakos, 2016-2019.
  18. Leverhulme Trust Fund, Visiting Professorship grant, Unified Integral Transforms in Microfluidics and Micro-Scale Heat and Mass Transfer ( $\mu$ UNIT), University College London, UK, with Prof. Stavroula Balabani, 2017-2018.
  19. International Cooperation Project, Royal Academy of Engineering, RAEng, UK, Self-cleaning coatings for targeting solar energy and water supply mismatch in India and Brazil, Coordinator: Prof. Ioannis Papakonstantinou and Prof. Manish Tiwari, University College London (UK), 2019-2020.  
<https://www.raeng.org.uk/test-dnp/frontiers-archive/frontiers-follow-on-grants/awardees-2019-2020/self-cleaning-coatings-for-targeting-solar-energy>
  20. International Cooperation Project, 3D Printing of Piezoelectric Metamaterials for Ambient Energy Harvesting, CNRS 2020 International Emerging Actions (IEA), Principal Investigator – Dr. Liviu Nicu, LAAS & COPPE – sponsored by CNRS (2021-2023).
  21. International Mobility Project – FAPERJ/French Embassy (France-Brasil), METATERM Project: Modelling, Project, Fabrication and Application of Thermal Metamaterials, with Prof. Mohammed Lachi, Université de Reims, France, 2022.
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## EVENTS ORGANIZATION AND LECTURES

1. Member, Organizing or Scientific Committee for more than 100 symposia and international conferences, including Co-Chairman of the Computational Heat Transfer 1997, in Cesme, Turkey, Chairman of the 2<sup>nd</sup> International Conference on Computational Heat and Mass Transfer, ICCHMT 2001, in Rio de Janeiro, Brasil, Co-Chairman of the School on Microfluidics (Brasília, UNB, 2006), Chairman of the International Heat Transfer Conference, IHTC-18, Rio de Janeiro, in 2026.
2. More than 150 invited lectures and short-courses in international and national events and Universities, including the International Heat Transfer Conference, Brighton, UK, 1994, ICHMT International Symposium on Transient Convection, Cesme, Turkey, 1996, NATO ASI on Microscale Heat Transfer, Turkey, 2004, 4<sup>th</sup> International Conference on Computational Heat and Mass Transfer, Paris, France, 2005, 4<sup>th</sup> Workshop on Integral Transforms & Benchmark Problems (Rio de Janeiro, 2005), School on Microfluidics (Brasília, UNB, 2006), 1<sup>a</sup>. Escola de Nanociências e Nanotecnologia da UFRJ (Rio de Janeiro, 2006), National Congress of Mechanical Engineering (CONEM 2008, Salvador), ICCHMT International Symposium on Convective Heat and Mass Transfer in Sustainable Energy, CONV-09 (Tunisia, 2009), Brazilian Congress of Thermal Sciences and Engineering (ENCIT 2010, Uberlândia, and ENCIT 2012, Rio de Janeiro), International Congress of Mechanical Engineering, ABCM (COBEM 2013, Ribeirão Preto, SP), 13th UK National Heat Transfer Conference, 2013 - (Imperial College, London), ASME 2013 National Heat Transfer Conference - (HT2013, Minneapolis), 3rd International Conference on Computational Methods for Thermal Problems - (ThermaComp2014, Slovenia), ICCHMT International Symposium on Convective Heat and Mass Transfer in Sustainable Energy - (CONV-14, Turkey), ICHMT Int. Symposium on Computational Heat Transfer (CHT-2015, New Jersey), 9th Minsk International Seminar Heat Pipes, Heat Pumps, Refrigerators, Power Sources

(Minsk, 2015, Belarus), 7th European Thermal Sciences Conference, EURO THERM 2016 (Krakow, Poland, June 2016), ICHMT Int. Symposium on Computational Heat Transfer (CHT-2017, Napoli, Italy), Int. Workshop on Sustainable Energy, Power, and Propulsion (ISEPP 2018, Kurukshetra, India), ICHMT Int. Symposium on Turbulence, Heat and Mass Transfer (THMT-2018, Rio de Janeiro), 10th Minsk International Seminar Heat Pipes, Heat Pumps, Refrigerators, Power Sources (Minsk, 2018, Belarus), TOBB-TUBA Energy 2018 (Ankara, Turkey), Science Diplomacy for Sustainable Development (Cairo, 2019, Egypt), 6th Int. Conf. on Thermophysical and Mechanical Properties of Advanced Materials, THERMAM (Cesme, 2019, Turkey), TOBB University – Lecture in Honor of Prof. Sadik Kakaç (Ankara, 2019, Turkey), 10º Encontro Técnico de Materiais e Química, ETMQ (Rio de Janeiro, 2019), 8a. Semana de Engenharia Nuclear, UFRJ (Rio de Janeiro, 2020), 2021 Inauguration Lecture - Centro Universitário SENAI-CIMATEC (Salvador, 2021), Nuclear Technology Trade & Exchange – NT2E, ABDAN (Rio de Janeiro, 2021), ICHMT International Symposium on Advances in Computational Heat Transfer, CHT-21 (Rio de Janeiro, 2021), Int. Symp. on Convective Heat and Mass Transfer in Sustainable Energy, CONV-22 (Izmir, 2022).