

MARCO AURÉLIO DOS SANTOS BERNARDES

ABOUT ME

I am an experienced Senior Mechanical Engineer with a global perspective.

My Background: With a diverse background, I have had the privilege of working on projects across multiple continents, including South Africa, China, Brazil, the USA, Luxembourg, and Germany.

My Approach: I pride myself on my intercultural mindset. I see myself as a guest in every place I go, and I approach each person with respect and a genuine interest in their culture and way of life. My inquisitive *modus operandi* drives me to continually expand my horizons. I thrive on openness, curiosity, creativity, enthusiasm, out-of-the-box thinking, flexibility, and vision, all of which enhance my abilities and experiences

My Aspirations: My goal is to continue my exceptional career within the industry, tackling the growing complexity of engineering systems by harnessing the latest technological advancements. I am committed to staying at the forefront of innovation and making a meaningful impact on the field

Voluntary Social Service: Diaconal, Childcare, Soup Distribution to the Homeless

PROFILE

Competencies: Academy/Industry development experience, software development, product development, modeling, simulation, optimization, and system design, knowledge transfer and expansion of modeling methodology, validation, vacuum technology, HVAC (Heating, Ventilation, and Air Conditioning), efficient energy use, energy economics and system analysis, renewable energy, life cycle assessment, and CO₂ footprint, GD&T (Geometric Dimensioning and Tolerancing), solar energy, complex flow and heat transfer analysis, turbulence, thermal expansion, and thermal contact resistance, biofuels.

Programming: Fortran, Java, Delphi, Visual Basic, C++, Perl, R, Python NUMPY, bash, awk scripts, MPI, OpenMP, JavaScript, JSON, VUE, Tapestry

IT and computer skills: Embedded systems, CFD/FEM/CAE/CAD/CAM, SigmaNEST, OpenFoam, COMSOL Multiphysics, STAR-CCM+, FEA, ANSYS, gmsh, Salome-Meca, Solidworks, SolidEdge, Inventor, NX, Rhino, SpaceClaim, OnShape, DesignSpark, Google SketchUp, AutoCAD, CATIA, CREO, FreeCAD, CADDuctor, LabVIEW, Java EE, Eclipse, NetBeans, CitrixMATLAB/Simulink, Maple, Wolfram Mathematica, ESATAN, Linux, AWS, IntelliJ IDEA

English ♦♦♦♦

German ♦♦♦♦

Portuguese ♦♦♦♦

Spanish ♦♦

WORK EXPERIENCE

❖ **Senior Development Engineer, promeos GmbHsince 09/2024**
Fürth, Germany

Development of Innovative High-Temperature Precision Heating Systems: thermal analysis, CFD/FEM, Ceramic and porous Materials ♦ Tools: COMSOL, PTC Creo, Python.

❖ **CAD-Expert, SIEMENS Energy / Scherer Ingenieure 09/2022 – 01/2023**
Erlangen, Germany

Design and planning of HVDC components, programming (VBA), vault (~GIT) ♦ Tools: Autocad / Inventor, EDV, SAP

❖ **Sabbatical.....07 – 08/2022**

❖ **Senior Development Engineer, ISO-Gruppe GmbH06/2023 – 04/2024 & 05 – 06/2022**
Nuremberg, Germany

Code development and maintenance (C++), etc. ♦ Tools: SIEMENS SIMATIC, Microsoft Visual Studio, etc.

Aviation Software Maintenance and Migration ♦ Tools: IntelliJ IDEA, V.Studio, Java, C++, bash, XML/JSON, JavaScript, Vue.js, etc.

- ❖ **Senior Development Engineer, Adidas AG & Gulp.....07/2020 – 04/2022**
Herzogenaurach, Germany
Plastic Technology, Process, and Component Simulation: Mechanical Properties, Temperature Distribution, Heating Simulation, Forming Simulation; Design and Evaluation of Tools and Machinery Before Experimentation; Development of a Graphic User Interface (GUI) for CFD/FEA Simulations ♦ Tools: COMSOL Multiphysics, Java, CADDuctor, Rhino, etc.
- ❖ **Senior Mechanical Engineer, Framatome GmbH & Neumüller GmbH.....01. – 06/2020**
Erlangen, Germany
Code development and maintenance (Fortran/C++), Validation, modeling of individual components, design of thermal equipment and system components, research 3D printed heat exchangers, etc. ♦ Tools: Fortran/C++
- ❖ **Senior Mechanical Engineer CAD/CAM, SigmaNEST GmbH.....06. – 09/2019**
Hamburg, Germany
Provision of technical CAD/CAM support and communication of solutions to end users ♦ Tools: SigmaNEST, DesignSpark, CAD und PDM-Systeme, Autodesk AutoCAD, Inventor, Vault, Solidworks, PTC Creo, WindChill, Siemens NX, SolidEdge, SpaceClaim, etc.
- ❖ **Senior Product Development Engineer, Lutena Vakuum GmbH04/2017 – 03/2019**
Buchholz in der Nordheide, Germany
Entire computer-aided development process for a new vacuum pump: CAD design, prototype development (for 3D printing), development of a mathematical model for numerical simulation, CFD simulations and parameter optimization, the visualization, the discussion and the interpretation of the simulation results, sheet metal CAD, etc ♦ Tools: CAD/CAM, HPC, SolidEdge, FreeCAD, DesignSpark, OpenFoam, gmsh, MATLAB, Python, scripts (Linux), parallel computing (MPI), MS Office.
- ❖ **Interdisciplinary Scientist, Universität Hamburg08/2014 – 01/2017**
Hamburg, Germany
Humboldt Research Fellowship for Experienced Scientists: POSTDOC: Research assignment for the calculation of heat transfer coefficients and pressure loss factors in updraft power plants; Development of the mathematical model for complex airflows; Derivation of complex equations in the field of fluid dynamics and heat transfer; Coaching and mentoring of student teams; Scientific publications ♦ Tools: OpenFOAM, gmsh, parallel computing (MPI), Star CCM+, COMSOL, Java, MS Office.
- ❖ **Scientist, CRP Henri Tudor / CRTE01/2011 – 12/2011**
Esch-sur-Alzette, Luxembourg
Research Projects: Development of an integrated tool for the life cycle optimization of buildings according to environmental criteria and an optimization algorithm ♦ Tools: EnergyPlus, openLCA, Java ♦ Publications: 8,9,10,13-18,20,24-36
- ❖ **Professor, many universities10.1996 – 07/2014**
Brazil
Research, leadership, 17 years of activities including a graduate course establishing, international projects, teaching of graduate and undergraduate lectures, seminar organizing, theses supervision and examination, dean of the Mechanical Engineering Department, Council Advisor and Research Coordinator, Teaching: 3320 hours ♦ Tools: Design of Experiments, error analysis, laboratory tests, MS Office, ANSYS, Star-CCM+, Java, Delphi, Umberto, AutoCAD, Solidworks, COMET (CFD), COMSOL Multiphysics, MS Office, FEM, C++, etc. Projects: D, E.

EDUCATION

- ❖ **POSTDOC, Stellenbosch University01 – 12/2007**
Stellenbosch, South Africa
Research on Power Control Analysis of Solar Chimneys ♦ Tools: Maple, MS Office, etc. ♦ Publications: 21,22,28
- ❖ **PhD in Mechanical Engineer, IER – Universität Stuttgart04.1999 – 12/2002**
Stuttgart, Germany
Theme: Technical, economic and ecological Analysis of Solar Chimneys. ♦ Projects: B, C ♦ Tools: Delphi, LCA (Balance), Adobe Pagemaker, MS Office ♦ Publications: 6,7,23

❖ **Master in Mechanical Engineering, UFMG 08.1994 – 04.1996**

Belo Horizonte, Brazil

Thermal Analysis of Solar Chimneys ♦ Tools: CFD, Fortran, MATLAB, MS Office ♦ Publications: 24,34,35,36 ♦ Product development: 2

❖ **Bachelor in Mechanical Engineering, CEFET-MG..... 02.1988 – 06.1994**

Belo Horizonte, Brazil

Research on heat exchangers ♦ Tools: Pascal, DOS, Ventura Publish, MS Office, Lotus 123, Word Perfect, ChiWriter

PRODUCT DEVELOPMENT

- A test device for automobile suspension (vibration and fatigue), AETHRA Brazil, 1997
- A small freight elevator, MECAM..... Brazil, 1997
- Development of vacuum pumps, Lutenna Vakuum GmbH Buchholz i.d.N, Germany, 2019

TRAININGS

Autodesk Vault Workgroup: The Complete Guide, Autodesk Inventor: iLogic, Autodesk Vault: Basic, Elektrosicherheit auf Testfeldern, HVDC Classic, Line Commutated Converter (LCC), HVDC PLUS - Basics of Voltage Source Converter (VSC) and Modular Multilevel Converter (MMC), HVDC Technology, General Introduction, Advanced-Schulung – Autodesk® Vault Workgroup, Individual-Workshop iLogic, Basis-Schulung – Autodesk® Vault, Certified SigmaNest Associate, OpenFOAM Programming, OpenFOAM Turbulence, Netzwerk als Strategie der Karriereentwicklung für Wissenschaftler, Perfekt ins Forschungsprojekt II: Projekte leiten, Wissenschaftliche Abstracts schreiben – effizient und überzeugend, CD-Adapco, STAR-CCM+ Online, Project management fundamentals, Project management, Advanced Energy Audits for Commercial and Industrial Facilities, Sustainable Building Design, Financing of Energy Efficiency Projects, Beginning Energy Audits for Commercial Buildings, HVAC and Refrigeration, Life Cycle Analysis, Energy Simulations with TRNSYS, Visual DOE and DOE-2 simulations, Industrial Energy Audits for Industrial Facilities, Introductory training in Umberto® 4, Numerical computation of turbulent flows in research and practice, Parallel Programming Workshop, MPI and OpenMP for beginners and advanced topics in parallel programming, Computer Fluid Dynamics - High Performance Fortran Seminar with STAR-CD, Tutorial for fast solvers of large systems of equations

PROJECTS

- A. Development of a method for geometric optimization of the active structures within a pneumatic vacuum generator based on fluid mechanical simulations
- B. Bases for Sustainability Assessing of Energy Systems in Baden-Württemberg. University of Stuttgart. Activities: LCA of several Energy Generation Technologies in Baden-Württemberg, Germany, 2001
- C. Life cycle Assessment of selected Upcoming Power Generation Technologies. German Federal Ministry of Economics and Technology (BMW). Activities: Further development of the integrated software for LCA "Balance" (hybrid app.), Germany 2002
- D. Project sponsored by the USAID in cooperation with the Colorado University (USA). Develop Graduate Curriculum in Environmental Sustainability and Energy Efficiency, 2005
- E. Project sponsored by the Brazilian National Counsel of Technological and Scientific Development – CNPq in cooperation with Colorado University (USA): Technical expertise in sustainability and Energy Efficiency Technologies in Buildings and Industrial facilities, 2003 - 2004

AWARDS AND HONORS

- ADL's Building Materials Challenge, Sto Corp. and US-Department of Energy, 2018
- Recognized reviewer: Applied Energy: 2017, 2016; Solar Energy: 2016; Applied Thermal Engineering: 2018, 2016; Energy: 2015; Renewable Energy: 2017, 2015; Solar Energy: 2013; Applied Mathematical Modelling: 2017, International Journal of Thermal Sciences: 2018; Outstanding reviewer: Renewable Energy: 2017, 2015, Solar Energy: 2018, 2017, 2014, Energy Conversion and Management: 2018, Applied Thermal Engineering: 2018; Certificate of Excellence in Reviewing – International Solar Energy Society: 2013
- LCA Award – Runner-up for the UNEP/SETAC Life Cycle Assessment Award for LCA Projects in Development Countries, Zurich, Switzerland, Aug 2007

CONSULTING

- VisasQ
- Guidepoint

PATENT

Methods and Mechanisms for Thermal Semi Conduction, #20090194263, USA..... Feb 5, 2008

AWARDED FELLOWSHIPS

- CNPq Scientific Initiation Fellow at CEFET-MG – Thermal Sciences:03/91 - 02/92
- Coaching of undergraduate Students– Mechanical Engineering Department – UFMG:08/94 - 12/94
- CAPES Master Fellow at UFMG:03/94 - 02/97
- DAAD Ph.D. Fellow at University Stuttgart:12/99 – 12/2002
- Stellenbosch University Postdoc Fellow:01 – 12/2007
- JICA Training Fellow:06 – 07/2008
- Alexander von Humboldt Postdoc Fellow:08/2014 – 01/2017

EXAMINER AND ADVISOR

Examiner: Ph.D. Thesis: 4 (e.g.: principal examiner at the University College London)	Master: 7
Supervisor of diploma and master's theses:	Diploma thesis: 5 Master: 2

PUBLICATIONS

Book editor

1. Developments in Heat Transfer, ISBN 978-953-307-569-3, INTECH, September 2011
2. Biofuel Production-Recent Dev. and Prospects, ISBN 978-953-307-478-8, INTECH, September 2011
3. Environmental Impact of Biofuels, ISBN 978-953-307-479-5, INTECH, September 2011
4. Economic Effects of Biofuel Production, ISBN 978-953-307-178-7, INTECH, August 2011
5. Biofuel's Engineering Process Technology, ISBN 978-953-307-480-1, INTECH, August 2011

Books

6. Briem, S., Blesl, M., Bernardes, M. S., Fahl, U., Krewitt, W., Rath-Nagel, S., Nill, M., Voß, A., Grundlagen zur Beurteilung der Nachhaltigkeit von Energiesystemen in Baden-Württemberg, Stuttgart, v.1. p.118, 2002.
7. Lebenszyklusanalysen ausgewählter zukünftiger Stromerzeugungstechniken, Institut für Energiewirtschaft und Rationelle Energieanwendung (IER), Stuttgart, n.d. http://www.ing-buero-moerschner.de/pdf/pub/Briem_et_al2004_BMWI-LCI-Bericht_ktr670.pdf.

Book chapters

8. Convective Heat Transfer Coefficients for Solar Chimney Power Plant Collectors (2011), Aziz Belmiloudi (Ed.) ISBN 978-953-307-550-1, INTECH, In book: Heat Transfer
9. Solar Chimney Power Plants– Developments and Advancements (2010), Solar Energy, Radu D Rugescu (Ed.), ISBN: 978-953-307-052-0, INTECH, DOI: 10.13140/2.1.4529.7604 In book: Solar Energy

Reports

10. Carlos Feu Alvim, Omar Campos Ferreira, Olga Mafrá Guidicini, Frida Eidelman, Paulo Achtschin Ferreira, Marco Aurélio Santos Bernardes. Comparison of the emission of greenhouse gases (GHGs) in the generation of electricity in Brazil with those of other sources, ecen consulting, Brazil, Mar 2011(http://ecen.com/eee79/eee79p/gases_nuclear.htm)

Peer-Review papers

11. Marco Aurélio dos Santos Bernardes (2024). Introducing Novel Geometric Insights and Three- Dimensional Depictions of the Pythagorean Theorem for any Triangles. International Journal of Pure and Applied Mathematics Research, 4(2), 47-58. doi: 10.51483/IJPAMR.4.2.2024.47-58
12. Marco Aurélio dos Santos Bernardes, 2017, Correlations for the symmetric converging flow and heat transfer between two nearly parallel stationary disks similar to a solar updraft power plant collector, In Solar Energy, Volume 146, 2017, Pages 309-318.
13. Marco Aurélio dos Santos Bernardes, 2017. Preliminary stability analysis of the convective symmetric converging flow between two nearly parallel stationary disks similar to a Solar Updraft Power Plant collector. Sol. Energy 141, 297–302.
14. Marco Aurélio dos Santos Bernardes, Experimental Evidence of the Working Principle of Thermal Diodes Based on Thermal Stress and Thermal Contact Conductance – Thermal Semiconductors, Int. Journal of Heat and Mass Transfer, Vol. 73C, pp. 354-357, 2014
15. Zhou, X., von Backström, T.W., Bernardes, M.A. dos S., Introd. to the Special Issue on Solar Chimneys. Solar Energy 98, Part A, 1, 2013.
16. Marco Aurélio dos Santos Bernardes, X. Zhou, Strategies for solar updraft tower power plants control subject to adverse solar radiance conditions, Solar Energy, Volume 98 – Part A, December 2013, Pages 34–41, <http://dx.doi.org/10.1016/j.solener.2013.06.007>.
17. Marco Aurélio dos Santos Bernardes, On the heat storage in Solar Updraft Tower collectors – Influence of soil thermal properties, Solar Energy, Volume 98 – Part A, December 2013, Pages 49–57, <http://dx.doi.org/10.1016/j.solener.2013.07.014>
18. X. Zhou, S. Yuan, M.A.d.S. Bernardes, Sloped-collector solar updraft tower power plant performance, International Journal of Heat and Mass Transfer, 66(0) (2013) 798-807, <http://dx.doi.org/10.1016/j.ijheatmasstransfer.2013.07.060>
19. Marco Aurélio dos Santos Bernardes, Xiping Zhou, On the heat storage in Solar Updraft Tower collectors – Water bags, Solar Energy, Volume 91, May 2013, Pages 22–31, <http://dx.doi.org/10.1016/j.solener.2012.11.025>

20. Xinping Zhou, Marco A. dos S. Bernardes, Reccab M. Ochieng, Influence of atmospheric cross flow on solar updraft tower inflow, Energy, Volume 42, Issue 1, June 2012, Pages 393–400, <http://dx.doi.org/10.1016/j.energy.2012.03.037>.
21. Marco Aurélio dos Santos Bernardes, Theodor W. von Backström, Evaluation of Operational Control Strategies Applicable to Solar Chimney Power Plants, Solar Energy, 84, (2), 277-288, 2010. <http://dx.doi.org/10.1016/j.bbr.2011.03.031>
22. Marco Aurélio dos Santos Bernardes, Theo W. von Backström. Analysis of Some Available Heat Transfer Coefficients Applicable to Solar Chimney Power Plant Collectors. Solar Energy. 83, 264-275, 2009. <http://dx.doi.org/10.1016/j.solener.2009.11.009>
23. Marco Aurélio dos Santos Bernardes. Development of the initiative 'The LCA Software Award'. International Journal of Life Cycle Assessment, v. 14, p. 1, 2008. DOI: 10.1007/s11367-008-0018-8
24. Marco Aurélio dos Santos Bernardes; Alfred Voß, Gerhard Weinrebe, Thermal and Technical Analysis of Solar Chimneys, Solar Energy, v.75, n.6, p.511 - 524, 2003. <http://dx.doi.org/10.1016/j.solener.2003.09.012>
25. Marco Aurélio dos Santos Bernardes, Ramón Molina Valle, Márcio Fonte-Boa Cortez., Numerical Analysis of natural laminar convection in a radial solar heater, International Journal of Thermal Sciences, Vol. 38, N° 1, Elsevier, 1999. [http://dx.doi.org/10.1016/S0035-3159\(99\)80015-4](http://dx.doi.org/10.1016/S0035-3159(99)80015-4)

Congress papers

26. Marco Aurélio dos Santos Bernardes*, E. Benetto, A. Marvuglia, D. Koster, Environmental life cycle assessment and optimization of buildings, LCM 2011 - Towards Life Cycle Sustainability Management, Berlin, Germany, August 28 – 31th, 2011.
27. Marco Aurélio dos Santos Bernardes, Thermal Semiconductors as Power Control Strategy for Solar Chimney Power Plants, 2nd International Conference on Solar Chimney Power Technology, Bochum, Germany, September 28 – 30th, 2010.
28. Marco Aurélio dos Santos Bernardes, Thermal Semiconductor Systems-An Innovative Conduction Heat Transfer Application, 30th International Thermal Conductivity Conf. and 18th International Thermal Expansion Symposium, Pittsburgh, USA, September, 2009.
29. Marco Aurélio dos Santos Bernardes, Life Cycle Assessment Modeling for Bifuel Vehicles, Third International Conference of Life Cycle Assessment in Latin America, CILCA 2009, Pucón, Chile, 2009.
30. Marco Aurélio dos Santos Bernardes, Theo W. von Backström, Detlev Kröger. Critical Evaluation of Heat Transfer Coefficients Applicable to Solar Chimney Power Plant Collectors. In: Proceedings of the ISES Solar World Congress 2007, Beijing, 2007.
31. Marco Aurélio dos Santos Bernardes. Summary of the progress of the project Initiative to Implement a Center of Excellence in Life Cycle Assessment an awarded proposal by the Life Cycle Initiative released by UNEP/SETAC. In: Proceedings of the 3rd International Conference on Life Cycle Management, Zurich, 2007.
32. Marco Aurélio dos Santos Bernardes, Desenvolvimento de um Currículo para Formação de Multiplicadores Especializados em Avaliação do Ciclo de Vida, Conferência Internacional de Avaliação de Ciclo de Vida - CILCA 2007, São Paulo, February, 2007.
33. Marco Aurélio dos Santos Bernardes, A Metodologia da Avaliação do Ciclo de Vida e sua Aplicação no Setor Energético, Congresso Brasileiro de Eficiência Energética, Belo Horizonte, Brazil, Anais de CBEE 2005, v.1, p.183-186, 2005.
34. Marco Aurélio dos Santos Bernardes, Life Cycle Assessment of Solar Chimneys, World Renewable Energy congress VIII, Proceedings of the World Renewable Energy congress VIII, Denver, USA, 2004.
35. Marco Aurélio dos Santos Bernardes, Symmetric Sink Flow and Heat Transfer Between Two Parallel Disks, ASME - Summer Heat Transfer Conference, Las Vegas, Nevada, USA, July, 2003, doi:10.1115/HT2003-47103
36. Marco Aurélio dos Santos Bernardes, Ramón Molina Valle, Márcio Fonte-Boa Cortez, Análise Térmica de um Sistema Aero-Solar Radial, III CIDIN Congresso Iberoamericano de Ingeniería Mecánica, 1997, Havana, Cuba.
37. Marco Aurélio dos Santos Bernardes, Márcio Fonte-Boa Cortez, Ramón Molina Valle, Estudo do Escoamento Laminar em Sistemas Aero-Solares, XIV COBEM - Congresso Brasileiro de Engenharia Mecânica, São Paulo, Brazil, 1997.
38. Marco Aurélio dos Santos Bernardes, Ramón Molina Valle, Márcio Fonte-Boa Cortez, Modelamento Numérico da Convecção Natural num Sistema Aero-Solar Radial, XVIII CILANCE Congresso Ibero Latino-americano de Métodos Computacionais em Engenharia, Brasília, Brazil, 1997.

PUBLICATION IMPACT

	citations	h-index	Number of works
Google Scholar	1367	17	49
Scopus	753	11	17
Web of science	626	11	20
ResearchGate	1107	15	22



I review for: International Journal of Heat and Mass Transfer, Solar Energy, Energy Conversion and Management, Applied Energy, Renewable Energy, Applied Thermal Engineering

ELSEVIER

Soli Deo Gloria