M. Parans Paranthaman
Chemical Sciences Division
Oak Ridge National Laboratory
1 Bethel Valley Rd., Oak Ridge, TN 37831

Corporate Fellow
Email: paranthamanm@ornl.gov
(865) 386-9030 (cell)

Education and Training:

Indian Institute of Technology, Madras	Ph.D.	1988	Materials Science and Solid State Chemistry
Madurai Kamaraj University, Madurai, India	M. Sc.	1982	Chemistry
Madurai Kamaraj University, Madurai, India	B.Sc.	1980	Chemistry

Research and Professional Experience:

2017-Present	Distinguished Corporate Fellow, Oak Ridge National Laboratory (ORNL)
2010-Present	Professor, Bredesen center, The University of Tennessee, Knoxville
2006-2017	Distinguished Research Staff Member and Group Leader, ORNL
1999-2005	Senior Research Staff Member, ORNL
1993-1999	Research Staff Member, ORNL
1991-1993	University of Colorado, Boulder, Research Associate, Condensed Matter (worked with **Professor Allen M. Hermann**)
1988-1991	The University of Texas at Austin, Postdoctoral, Materials Science (worked with Nobel Prize Winner **Professor John B. Goodenough**)
1982-1988	Research Fellow, Materials Science Research Center, Indian Institute of Technology, Madras, India (Ph.D. Thesis Advisor: **Professors G. V. Subba Rao and G. Aravamudan**)

Professional Activities, Honors, Awards:

Editor, Journal of Alloys & Compounds (2023-Present)
IIT Madras, India Alumnus Award (2023)
ORNL Director's Award for Science & Technology (2020)
ORNL Top Scientist of the Year (2019)
Fellow of National Academy of Inventors (2018)
ORNL Corporate Fellow (2017)
ORNL Technology Transfer Award (2017, 2018, 2019, 2020, 2021)
Battelle Celebration of Solvers Award (2016)
UT-Battelle Inventor of the Year Award (2016)
Fellow: NAI (2018); APS (2018); ORNL Corporate Fellow (2017); Materials Research Society (MRS) (2016); AAAS (2015); Acers (2015); ASM International (2014); IOP London (2004)
Seven R&D 100 Awards for developing "Novel Electrodes for Lithium-Ion Batteries"; "Additive Manufacturing of Permanent Magnets"; "High Performance, Superconductor Wires"; "GaN Power Electronics" and "Superhydrophobic Coatings" (2017; 2016; 2015; 2012; 2010; 2007; 1999)
Three FLC National and Two Southeast Regional Awards; Excellence in Technology Transfer Award (2012; 2011; 2010; 2007; 2001)
Ranks # 2 in worldwide citations in the HTS research during the last decade (1999-2009)
Outstanding DOE Mentor Award (2006-2008)
Nova 50 Award for Technical Accomplishments (2006)
Selected as one of 11 "Distinguished Inventors" at ORNL by UT-Battelle (2003)
Energy-100 award for developing the RABiTS Technology (2001)
Lockheed Martin Scientist of the Year Award (1997)
Editorial Board, Superconductor Science and Technology (2003-2009)
Associate Editor, Journal of the American Ceramic Society (2004-Present)
Editorial Board, Materials Science and Engineering B Journal (2017-2020)

Editorial Board, MRS Advances (2016-2020)

1996 Department of Energy's (DOE), Office of Science, Materials Science Award for technical achievement in Solid State Physics

Co-Editor, Book on "Semiconductor Materials for Solar Photovoltaic Cells," Springer, 2015

Co-Editor, Book on "Advances in Materials Science for Environmental and Energy Technologies II," *Ceramic Transactions,* Volume 241, John Wiley & Sons, Inc., 2013

Co-Editor, Book on "High Temperature Superconductors," Wiley-VCH, 2010

Co-Editor, Book on "Flux Pinning and AC Loss Studies on YBCO Coated Conductors," Nova Science Publishers, 2007

Co-Editor, Book on "High-Temperature Superconductor Materials, Devices, and Applications," *Ceramic Transactions,* Volume 160, The American Ceramic Society, Ohio, 2004

Co-Editor, Book on "Materials for High-Temperature Superconductor Technologies," Materials Research Society, 2002

Technical Editor, Materials Branch, **IEEE** Trans. on Applied Superconductivity, Applied Superconductivity Conference, Chicago, Illinois, August 2008

Guest Editor, Special Issue on "Superconducting Wires and Tapes," Journal of Electronic Materials, October 2007

Technical Editor, Materials Branch, **IEEE** Trans. on Applied Superconductivity, Applied Superconductivity Conference, Seattle, Washington, August 2006

Guest Editor, Special Issue on "High performance YBCO coated conductors," MRS Bulletin, August 2004

Technical Editor, Materials, **IEEE** Trans. on Applied Superconductivity, Applied Superconductivity Conference, Jacksonville, Florida, October 2004

Technical Editor, Materials Branch, **IEEE** Trans. on Applied Superconductivity, Applied Superconductivity Conference, Houston, Texas, August 2002

Selected Journal Publications: (Total of >450 referred journal publications **including 42 IEEE transaction journal publications**; Google citations: 22498; **Google scholar *h-index:*** *73*; 15 book chapters; 57 Issued US Patents; co-edited 4 books)

1. Goyal, A.; Norton, D.P.; Budai, J.D.; Paranthaman, M.P.; Specht, E.D.; Kroeger, D.M.; Christen, D.K.; He, Q.; Saffian, B.; List, F.A.; Lee, D.F.; Martin, P.M.; Klabunde, C.E.; Hatfield, E.; Sikka, V.K. Fabrication of Long Range, Biaxially Textured, High Temperature Superconducting Tape on Rolled Ni Substrates, *Appl. Phys. Lett.* 1996*, 69*, 1795-1797.
2. Norton, D.P.; Goyal, A.; Budai, J.D.; Christen, D.K.; Kroeger, D.M.; Specht, E.D.; He, Q.; Saffian, B.; Paranthaman, M.P.; Klabunde, C.E.; Lee, D.F.; Sales, B.C.; List, F.A. Epitaxial YBa2Cu3O7 on Biaxially-Textured (001) Ni: An Approach to High Critical Current Density Superconducting Tapes, *Science* 1996*, 274*, 755-757.
3. Paranthaman, M.P.; List, F.A.; Goyal, A.; Specht, E.D.; Vallet, C.E.; Kroeger, D.M.; Christen, D.K. Growth of TlBa2Ca2Cu3O9-y Superconducting Films with Local Biaxial Alignment Extending up to 5 mm on Ag Substrates using a Spray Pyrolysis Technique, *J. Mater. Res.* 1997*, 12*, 619-623.
4. Paranthaman, M.P.; Goyal, A.; List, F.A.; Specht, E.D.; Lee, D.F.; Martin, P.M.; He, Q.; Christen, D.K.; Norton, D.P.; Budai, J.D.; Kroeger, D.M. Growth of Biaxially Textured Buffer Layers on Rolled-Ni Substrates by Electron Beam Evaporation, *Physica C,* 1997*, 275*, 266-272.
5. Paranthaman, M.P.; Park, C.; Cui, X.; Goyal, A.; Lee, D.F.; Martin, P.M.; Chirayil, T.G.; Verebelyi, D.T.; Norton, D.P.; Christen, D.K.; Kroeger, D.M. YBCO Coated Conductors with High Engineering Current Density, *J. Mater. Res.* 2000*, 15*, 2647-2652.
6. Yang, C.Y.; Pashitski, A.; Polyanskii, A.; Larbalestier, D.C.; Babcock, S.E.; Goyal, A.; List, F.A.; Park, C.; Paranthaman, M.P.; Norton, D.P.; Lee, D.F.; Kroeger, D.M. Microstructural

Homogeneity and Electromechanical Connectivity of YBa2Cu3O7-δ Grown on Rolling-Assisted Biaxially Textured Coated Conductor Substrates, *Physica C* 2000*, 329,* 114-120.

7. Paranthaman, M.P.; Cantoni, C.; Zhai, H.Y.; Christen, H.M.; Aytug, T.; Sathyamurthy, S.; Specht, E.D.; Thompson, J.R.; Lowndes, D.H.; Kerchner, H.R.; Christen, D.K. Superconducting MgB2 Films via Precursor Post processing approach, *Appl. Phys. Lett.* 2001*, 78*, 3669-2671.
8. Paranthaman, M.P.; Chirayil, T.G.; Sathyamurthy, S.; Beach, D.B.; Goyal, A.; List, F.A.; Lee, D.F.; Cui, X.; Lu, S.W.; Kang, B.; Specht, E.D.; Martin, P.M.; Kroeger, D.M.; Feenstra, R.; Cantoni, C.; Christen, D.K. Fabrication of Long Lengths of YBCO Coated Conductors using a Continuous Reel-to-Reel Dip-Coating Unit, *IEEE Trans. Appl. Supercond.* 2001*, 11*, 3146-3149.
9. Paranthaman, M.P.; Aytug, T.; Christen, D.K.; Arendt, P.N.; Foltyn, S.R.; Groves, J.R.; Stan, L.; DePaula, R.F.; Wang, H.; Holesinger, T.G. Growth of thick YBa2Cu3O7-δ films carrying a critical current of over 230 A/cm on single LaMnO3-buffered ion-beam assisted deposition MgO substrates, *J. Mater. Res.* 2003*, 18* (9), 2055-2059.
10. Kang, S.; Goyal, A.; Li, J.; Gapud, A.A.; Martin, P.M.; Heatherly, L.; Thompson, J.R.; Christen, D.K.; List, F.A.; Paranthaman, M.P.; Lee, D.F. High-performance high-T-c superconducting wires, *Science,* 2006, *311,* 1911-1914.

Relevant Patents Issued; (Total Issued Patents: 57)

- M. Parans Paranthaman, S. Sathyamurthy, T. Aytug, P.N. Arendt, L. Stan, and S.R. Foltyn, "Chemical Solution Deposition Method of Fabricating Highly Aligned MgO Templates" United States Patent # 8,088, 503 B3, Issued on Jan. 3, 2012.
- M.P. Paranthaman, T. Aytug, D.K. Christen, R. Feenstra, and A. Goyal, "Buffer layers and articles for electronic devices," U.S. Patent # 6,764,770 (issued Date: July 20, 2004).
- M. Paranthaman, D.F. Lee, D.M. Kroeger, and A. Goyal, "Buffer Layers on Metal Surfaces Having Biaxial Texture as Superconductor Substrates," U.S. Patent # 6,156,376 (Issued Date: December 5, 2000).
- R. Feenstra, D. K. Christen, and M. Paranthaman, "Method for making High-Critical Current-density $YBa_2Cu_3O_7$ Superconducting layers on Metallic Substrates," U.S. Patent # 5,972,847 (Issued Date: October 26, 1999).
- A. Goyal, E. D. Specht, D. M. Kroeger, and M. Paranthaman, "Method of forming Biaxially Textured Alloy Substrates and Devices thereon," U.S. Patent # 5,964,966 (Issued Date: October 12, 1999).

Synergistic Activities *(Conferences/Workshops Organized: > 8)*

- Technical Chair, DOE Workshop on Materials Innovation for Next Generation R&D Grid Components,, Oak Ridge, TN, August 26-27, 2015

Student Supervision Experience

Thesis Advisor and Postgraduate-Scholar Sponsor: I have co-advised several thesis projects of

- 7 Ph.D. students (through University of Tennessee, Knoxville and University of Houston)
- 2 M.S. students (through Tenn. Tech. Univ.)
- >80 Undergraduate students; 5 College teachers; 35 High school teachers, and >20 postdoctoral scholars

Present Post Docs (2):

- Jayanthi Kumar ; Willie Kemp

Present Graduate Students (2)

- Haobo Wang ; Saurabh Prakash Pethe

Teaching Experience

- Has delivered over 100 lectures, keynote speeches, workshop presentations, and invited talks.
- Has taught graduate level classes at the University of Tennessee, Knoxville.