

April 19, 2023

CURRICULUM VITA

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http://en.wikipedia.org/wiki/Deborah_Chung

<https://heritageproject.caltech.edu/interviews-updates/deborah-chung>

<http://engineering.buffalo.edu/mechanical-aerospace/people/faculty/d-chung.html>

<http://alum.mit.edu/www/ddlchung>

<https://scholar.google.com/citations?user=I1m7ZW8AAAAJ>

http://icue.nbcunifiles.com/icue/files/nbclearn/site/video/widget/NBC_Learn_Video_Widget2.swf?CUECARD_ID=62976

<https://www.youtube.com/watch?v=R9eij27I02E>

<https://publons.com/researcher/470715/ddl-chung>

PROFESSIONAL INTEREST

Multidisciplinary research and teaching that are focused on materials science and engineering, particularly multifunctional structural materials (with functions including self-sensing, self-powering and vibration damping), electromagnetic shielding materials, and thermal interface materials (for microelectronic cooling). Other topics include three-dimensional printing, dielectric conductors and interface-derived viscoelasticity.

SCIENTIFIC IMPACT

- A. Pioneer and the foremost international leader in the field of multifunctional structural materials (without device incorporation), with the following specific contributions.
 1. Invention of smart (self-sensing) concrete and associated development of piezoresistivity-based strain sensing in cement-based and carbon fiber composites.
 2. Discovery of the function of the interlaminar interface in carbon fiber polymer-matrix composites as a sensor, thus enabling unprecedentedly high sensitivity to changes at this damage-prone interface.
 3. Development of the self-sensing in carbon fiber polymer-matrix composite beams under flexure by surface resistance measurement, with the strain at the tensile and compressive surfaces separately and sensitively determined, and with the piezoresistivity mechanism elucidated.
 4. Development of capacitance-based self-sensing, with applications including 3D-printing monitoring (with unprecedented ability of sensing interlayer defects in the build).
 5. First report of structural capacitors (i.e., capacitors in the form of structural materials).
 6. Pioneering the emerging field of high-permittivity electronic conductors, first determination of the electric permittivity of electronic conductors (carbons and metals), discovery of ferroelectricity in a metal, and discovery of the application in electret-based self-powering (with unprecedented self-charging capability), with the latter discovery allowing structures to be energy sources (a new untapped source of energy), and with elucidation of the dielectric behavior in terms of the carrier-atom interaction (carrier meaning the mobile charges) and dielectric connectivity.
 7. Discovery of interface-derived viscoelasticity and the consequent unprecedented development of structural materials that are effective for vibration damping.
- B. Pioneer and the foremost international leader in the field of thermal interface materials for microelectronic cooling, with the following specific contributions.
 1. Changing the paradigm of the design of thermal interface materials from thermal-conductivity-based design to conformability-based design, thereby resulting in the development of superior but low-cost thermal interface materials that excel due to conformability.
 2. Development of unprecedentedly effective thermal pastes with conformable solid components.
- C. Pioneer and the foremost international leader in the field of materials for electromagnetic interference (EMI) shielding, with the following specific contributions.
 1. Changing the paradigm of the design of EMI shielding materials from electrical-conductivity-based design to interface-area-based design, thereby resulting in the development of an unprecedentedly effective EMI shielding material in the form of nickel-coated carbon nanofiber (originally known as nickel filament).
 2. Discovery of absorption-dominated EMI shielding in metals, the shielding of which has long been assumed to be dominated by reflection.
 3. Discovery of unusually high EMI shielding effectiveness in exfoliated-graphite-based flexible graphite sheets, which are valuable for EMI gasketing.
 4. Development of radio-wave reflective concrete and its application in automobile lateral guidance.

EXPERIENCE

UNIVERSITY AT BUFFALO, THE STATE UNIVERSITY OF NEW YORK, Buffalo, NY

*Professor of Mechanical and Aerospace Engineering (1986-present)

*Founding Director, Composite Materials Research Laboratory, 1989-present

*Niagara Mohawk Power Corp. Endowed Chair Professor, 1991-2008

CARNEGIE-MELLON UNIVERSITY, Pittsburgh, PA

*Associate Professor of Metallurgical Engineering and Materials Science (1982-1986)

*Assistant Professor of Metallurgical Engineering and Materials Science and Electrical Engineering (1977-1982)

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA (1974-77)

*Visiting Scientist at the Francis Bitter National Magnet Laboratory - Research on graphite intercalation compounds under the supervision of Professor M.S. Dresselhaus

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, CA (1971-73)

Research on superconducting alloys and amorphous materials under the supervision of Professor Pol E. Duwez

EDUCATION

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA

Ph.D. Degree in Materials Science, 1977

Thesis on "The Electronic, Lattice and Structural Properties of Graphite Intercalation Compounds" under the supervision of Professor M.S. Dresselhaus

S.M. Degree in Materials Science, 1975

Thesis on "Optical Studies of Graphite Intercalated with Bromine" under the supervision of Professor M.S. Dresselhaus

CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, CA

M.S. Degree in Engineering Science, 1973

B.S. Degree in Engineering and Applied Science, 1973

HONORS

Member, American Academy of Arts and Sciences, elected in 2023.

Feature article "Materials for electromagnetic interference shielding" by Chung is one of the most cited papers in Materials Chemistry and Physics, as well as the second highest cited feature article in this journal, August 2022.

Inaugural speaker, Professor Millie Dresselhaus Memorial Lecture, MIT, 2022.

Ranked 1st in the world in the field of Building and Construction (Stanford University study, 2021)

Ranked 1st among all researchers in University at Buffalo (living/deceased, all fields combined) (Stanford University study, 2021, 2022)

Ranked 13th among 315,721 materials researchers in the world (living and deceased), 10th among those that are living, and 1st among those who are female (Stanford University study, 2022).

Lan Wong and Deborah Chung Center for Science and Arts, Christian Central Academy, Williamsville, NY, building dedication in 2021.

Drs. Lan Wong and Deborah Chung Analytical Chemistry Laboratory, California State University, Northridge, laboratory dedication in 2021.

Drs. Lan Wong and Deborah Chung Distinguished Lecture Series on the Path to Professional Success, California State University, Northridge, initiated in 2021.

Drs. Lan Wong and Deborah Chung Lecture Series honoring the late Prof. M.S. Dresselhaus and the late Prof. K. Biemann, School of Science, MIT, initiated in 2021.

Drs. Lan Wong and Deborah Chung Graduate Student Scholarship Fund, School of Science, MIT, initiated in 2021.

Honoree, 4th UKIERI Concrete Congress, India, March 5-8, 2019.

Top Peer Reviewer 2019. For placing in the top 1% of reviewers in Materials Science on Publons global reviewer database. Also for placing in the top 1% of reviewers in Cross-Field on Publons global reviewer database.

Albert Nelson Marquis Lifetime Achievement Award, Marquis Who's Who, 2018.

The 2018 Publons' Global Peer Review Awards for being placed in the top 1% of peer reviewers in Materials Science (ranked 5th in the world) and for being placed in the top 1% of peer reviewers in Chemistry. These awards are based on the number of reviews of manuscripts submitted to various journals for consideration of publication.

Honoree, one of the three first alumnae of Caltech, 2018 (45th anniversary of graduation)

Pu-Woei Chen and D.D.L. Chung, "Carbon Fiber Reinforced Concrete as a Smart Material Capable of Non-Destructive Flaw Detection", *Smart Mater. Struct.* 2(1), 22-30 (1993). This paper is one of the 25 most cited papers in the 25-year history of the journal *Smart Materials and Structures*, 2017.

Paper with M. Sharma honored as Editors' Choice in *Journal of Electronic Materials*, 2015.

U.S. Faculty Scholar, Vietnam Education Foundation, 2013-14.

Visiting Professor, Hefei University of Technology, Hefei, P.R. China, appointed in 2013.

One of the top ten best cited papers in *Composites B* in all times past, honored in 2012.

Honorary Doctorate Degree, University of Alicante, Alicante, Spain, 2011.
Guest Professor, Tongji University, Shanghai, P.R. China, appointed in 2010.
Top Reviewer in 2008, an international award in relation to the journal Carbon, Elsevier Pub., 2009.
Special Recognition Award, The American Carbon Society, 2007.
Hsun Lee Award, jointly awarded by Institute of Metal Research (Chinese Academy of Sciences) and Shenyang National Laboratory for Materials Science, to recognize research accomplishment in materials science and technology, 2005.
Invited Professor, Tianjin University, Tianjin, P.R. China, appointed in 2005.
Visiting Professor, Jinan University, Jinan, P.R. China, appointed in 2005.
Charles E. Pettinos Award, a triennial international award to recognize one person or one group for outstanding research accomplishments in carbon science and technology, The American Carbon Society, 2004.
Chancellor's Award for Excellence in Scholarship and Creative Activities, Academic Year 2002-2003, The State University of New York.
Outstanding Inventor, State University of New York, 2002.
Visiting Professor, Wuhan University of Technology, Wuhan, P.R. China, appointed in 2002.
Visiting Professor, Southeast University, Nanjing, P.R. China, appointed in 2002.
Visiting Professor, Beijing Technology and Business University, Beijing, P.R. China, appointed in 2002.
Fellow, American Carbon Society, conferred in 2001.
Honorary Professor, Shantou University, Shantou, Guangdong, P.R. China, appointed in 2000.
Fellow, ASM International, conferred in 1998.
Advisory Professor, Harbin Institute of Technology, Harbin, P.R. China, appointed in 1995.
"Teacher of the Year", 1992-93, awarded by Tau Beta Pi (New York Nu).
Ralph R. Teetor Educational Award, Society of Automotive Engineers, 1987, for being one of the top engineering educators in the U.S.
Robert Lansing Hardy Gold Medal for the most promising metallurgist in the U.S. in 1980, American Institute of Mining, Metallurgical, and Petroleum Engineers
One of the four first woman graduates of California Institute of Technology, 1973
Josephine de Karman Fellowship (1972-73) for graduate and senior undergraduate students of exceptional ability

MEMBERSHIPS

Fellow, American Carbon Society, 2001-present; Member, 1979-present; Advisory Board member, 1999-2005;
Member, American Ceramic Society, 1989-1990, 1994, 2018, 2020, 2021.
Member, American Concrete Institute, 1989-1990, 1994-1996.
Member, American Society of Mechanical Engineers, 2014-18.
Fellow, ASM International (formerly known as the American Society for Metals, a professional organization for materials scientists and engineers), 1998-present; Member, 1986-present; Director of Buffalo Chapter, 1987-1994; Member of Superconductor Materials Committee, 1989-1993.
Member, Materials Research Society, 1981-2017.
Member, Society for the Advancement of Material and Process Engineering, 2007-2014.
Member, Society of Automotive Engineers, 1987-1989
Member, The Minerals, Metals & Materials Society (TMS), 1977-present. Executive Committee Member of the Three-Rivers Section of TMS-AIME, 1986. Member of the Membership Development Committee (national) of TMS-AIME, 1986-1988.

OTHER PROFESSIONAL ACTIVITIES

- * Invited Specialist of United Nations Development Program to assist the technical development of the People's Republic of China, July 16 - August 5, 1986.
- * Member, Committee on Materials for High Density Electronic Packaging, National Materials Advisory Board, Commission on Engineering and Technical Systems, National Research Council, 1987-1990.
- * Member, Panel for selection of Presidential Young Investigators, Division of Materials Research, National Science Foundation, November 23, 24, 1987.
- * Chairman, Symposium on Carbon Fibers and Composites, sponsored by American Carbon Society, Buffalo, NY, July 18-21, 1988.
- * Symposium Organizer, Symposium on Mechanical Behavior of Electronic Materials and Structures in Microelectronics, Material Research Society Meeting, Anaheim, April 1991.
- * Conference Chairman, Conference on Materials for Electronic Packaging, SUNY/ Buffalo, August 20-22, 1991.
- * Conference Chairman, 21st Biennial Conference on Carbon, sponsored by American Carbon Society, SUNY/ Buffalo, June 13-18, 1993.
- * Consultant to National Power PLC, UK, 1995-96.
- * Member, Proposal Review Panels, National Science Foundation, November 1997-present.
- * Topical Area Chairman, 23rd Biennial Conference on Carbon, sponsored by American Carbon Society, Pennsylvania State University, July 13-18, 1997.

- * Technical Co-Chair and Member of International Advisory Board, 5th International Conference on Composites Engineering, Las Vegas, NV, July 5-11, 1998.
- * Member, Advisory Board, American Carbon Society, 1999-2006.
- * Topical Area Chairman, 24th Biennial Conference on Carbon, sponsored by American Carbon Society, Charleston, SC, July 11-16, 1999
- * Member, International Editorial Board, New Carbon Materials (China), 1999- present
- * Member, Honorary Editorial Advisory Board, Carbon, 2001-present.
- * Member, Advisory Board, Carbon Letters (formerly Carbon Science) (Korea), 2007-present.
- * Member, International Editorial Board, Polymers & Polymer Composites, 2001-present.
- * External Reviewer for Research Grants Council, Hong Kong, 2001-present.
- * Member, International Advisory Committee, 2002 International Conference on Carbon, Beijing, China, Sept. 15-20, 2002.
- * Member, Local Scientific Committee, 14th International Conference on Composite Materials, San Diego, July 14-18, 2003.
- * Topical Area Chairman, Carbon 2004 International Conference, Providence, RI, July 11-16, 2004.
- * Editor, Book Series on *The Road to Scientific Success: Life Experience of Prominent Researchers*, World Sci. Pub., 2004-.
- * External Reviewer for State Natural Science Award, China, 2006.
- * Nominator, Kyoto Prize, Inamori Foundation, Kyoto, Japan, 2007, 2011 and 2015.
- * Associate Editor, Journal of Electronic Materials, 2008-.
- * Associate Editor, Polymers and Polymer Composites, 2008-2019
- * Reviewer for National Priorities Research Program, Qatar National Research Fund, 2009-.
- * Member, International Advisory Committee, World Conference on Carbon, Biarritz, France, June 14-19, 2009, organized by the French Carbon Group (GFEC).
- * Reviewer for King Abdulaziz City for Science and Technology, Saudi Arabia, 2009-.
- * Member, International Advisory Committee, World Conference on Carbon, Shanghai, China, July 24-29, 2011.
- * Member, International Experts Committee, new Doctorate Program on "Engineering of Materials, Structures and Terrain: Sustainable Construction", Department of Civil Engineering, University of Alicante, Alicante, Spain, 2012-13.
- * Member, Advisory Committee, School of Engineering, Hong Kong University of Science and Technology, Hong Kong, 2013.
- * Reviewer for National Centre of Science and Technology, Kazakhstan, 2014-
- * Reviewer for Office of Science, DOE, 2014-
- * Reviewer of Applications for Establishment of the Hong Kong Branches of Chinese National Engineering Research Centres, 2014.
- * Editor-in-Chief, Composite Materials section of SpringerMaterials, 1/2015 - 12/2016.
- * Member, Editorial Board, Functional Composite Materials (journal), Springer Nature (2017-).
- * Proposal reviewer, U.S. – Israel Binational Science Foundation, 2017.
- * Member, Panel on Review of In-house Laboratory Independent Research in Materials Sciences at the Army's Research, Development, and Engineering Centers, The National Academies, 2018-19.
- * Member, Advisory Committee, Carbon 2019 International Conference, Kentucky, July 2019.
- * Member, International Advisory Committee, Carbon 2020 International Conference, Kyoto, Japan, June 28 – July 3, 2020.
- * Member, Advisory Board, Materials Chemistry and Physics (journal), Elsevier (2020-).
- * Member, International Advisory Board, 2022 World Conference on Carbon, July 3-8, 2022, London, UK.
- * Member, Editorial Board, World Scientific Annual Review of Functional Materials (journal), World Sci. Pub. (2022-).
- * Member, Scientific Committee on the topic Carbon fibers and composites, The World Conference on Carbon 2023, Cancun, Riviera Maya, Mexico, July 16-21, 2023.

BOOKS

Authored books

1. Kenji Uchino, D.D.L. Chung and R.E. Newnham, *JME Materials Science: Introduction to Electrical Properties for Ceramists* (JME Zairyo Kagaku: Seramisuto no tame no Denki Bussei Nyumon), Uchida Rokakuho Publishing Co., Ltd., Tokyo, Japan, 1990, 156 pp. Book written in Japanese. Translated from English.
2. D.D.L. Chung, P.W. DeHaven, H. Arnold and D. Ghosh, *X-Ray Diffraction at Elevated Temperatures*, VCH Publishers, 1993.
3. D.D.L. Chung, *Carbon Fiber Composites*, 1st Ed., Butterworth-Heinemann, 1994; *Carbon Composites: Composites with Carbon Fibers, Nanofibers and Nanotubes*, 2nd Ed., Elsevier, 2017, 706 pages.
4. D.D.L. Chung, *Composite Materials for Electronic Functions*, Materials Science Foundations, Vol. 12, i-iii, 1-77, Trans Tech Publications Ltd., Switzerland, 2000.
5. D.D.L. Chung, *Applied Materials Science*, CRC Press, 2001.

6. D.D.L. Chung, *Composite Materials: Functional Materials for Modern Technologies*, 1st Ed., "Engineering Materials and Processes" Book Series, Brian Derby, Series Editor, Springer, 2003; *Composite Materials: Science and Applications*, 2nd Ed., Springer, 2010.
7. D.D.L. Chung, *Multifunctional Cement-Based Materials*, *Civil and Environmental Engineering* Book Series, Mike Meyer, Series Editor, Marcel Dekker, 2003.
8. D.D.L. Chung, Book series titled *Engineering Materials for Technological Needs*, Vol. 2, *Functional Materials: Electrical, Dielectric, Electromagnetic, Optical and Magnetic Applications*, World Scientific, 2010; Vol. 4, 2nd Ed., 552 pages, 2021.
9. Rebecca Chan Chung, D.D.L. Chung, Cecilia Ng Wong, *Piloted to Serve*, Deborah Chung, 2012; Enhanced Edition, 2020.
10. D.D.L. Chung, Book series titled *Engineering Materials for Technological Needs*, Vol. 3, *Carbon Materials: Science and Applications*, World Scientific, 2018, 382 pages.

Edited books

1. Ephraim Suhir, Robert C. Cammarata, D.D.L. Chung and Masahiro Jeno, *Materials Research Society Symposium Proceedings*, Vol. 226 (Mechanical Behavior of Materials and Structures in Microelectronics), Symposium held April 30 – May 3, 1991, Anaheim, CA, Materials Research Society, Pittsburgh, PA, 1991.
2. D.D.L. Chung and E.A. Heintz, *Extended Abstracts*, 21st Biennial Conference on Carbon, American Carbon Society, 1993.
2. D.D.L. Chung, *Materials for Electronic Packaging*, Butterworth-Heinemann, Boston, MA, 1995.
3. D.D.L. Chung, Book Series titled *The Road to Scientific Success: Inspiring Life Stories of Prominent Researchers*, World Scientific Pub., Singapore, Vol. 1, 2006; Vol. 2, 2014.
4. D.D.L. Chung, Book Series titled *Engineering Materials for Technological Needs*, World Scientific Pub., Singapore, 2005-. Vol. 1: *High Performance Construction Materials*, Caijun Shi and Y. L. Mo (eds.), World Scientific Pub., Singapore, 2008. Chinese translation, Chongqing University Press, China, 2011.

PATENTS (issued)

1. D.D.L. Chung, "Low-Density Graphite-Polymer Electrical Conductors", U.S. Patent 4,704,231 (1987).
2. D.D.L. Chung, "Composites of In-Situ Exfoliated Graphite", U.S. Patent 4,946,892 (1990), Canadian Patent 1,330,609 (1994).
3. D.D.L. Chung, "Exfoliated Graphite Fibers and Associated Method", U.S. Patent 4,915,925 (1990).
4. D.D.L. Chung, "Carbon Fiber Reinforced Cement Concrete Composites Improved by Using Chemical Agents", U.S. Patent 5,032,181 (1991).
5. D.D.L. Chung, "Superconductor-Metal Laminates and Method of Making", U.S. Patent 5,059,582 (1991).
6. D.D.L. Chung, "Carbon Fiber Composites with Improved Fatigue Resistance", U.S. Patent 5,091,242 (1992).
7. D.D.L. Chung, "Carbon Fiber Reinforced Tin Alloy as a Low Thermal Expansion Solder Preform", U.S. Patent 5,089,356 (1992).
8. D.D.L. Chung, "Phosphate Binders for Metal-Matrix Composites", U.S. Patent 5,536,686 (1996); European patent application WO 9409169 (1994).
9. Yi-Han Kao, Liwei Song, D.D.L. Chung and Kevin T. Fredette, "Halogen Doped Superconductive Fullerenes", U.S. Patent 5,380,703 (1995).
10. Yi-Han Kao, Liwei Song, D.D.L. Chung, and Kevin T. Fredette, "Inter-Halogen-Doped Superconductive Fullerenes," U.S. Patent 5,561,102 (1996).
11. D.D.L. Chung and Xiaoping Shui, "Metal Filaments for Electromagnetic Interference Shielding", U.S. Patent 5,827,997 (1998).
12. D.D.L. Chung, "Particulate Carbon Complex," U.S. Patent 5,643,670 (1997).
13. D.D.L. Chung and Weiming Lu, "Mesoporous Activated Carbon," U.S. Patent 5,990,041 (1999).
14. D.D.L. Chung, "Methods and Sensors for Detecting Strain and Stress," U.S. Patent 6,079,277 (2000).
15. D.D.L. Chung, "Composite Material Strain/Stress Sensor," U.S. Patent 5,817,944 (1998).
16. D.D.L. Chung, "Conformable Interface Materials for Improving Thermal Contacts", U.S. Patent 7,535,715 (2009); Chinese Patent CN 101416304 B (2011).
17. D.D.L. Chung and Chuangang Lin, "High-Performance Interface Materials for Improving Thermal Contacts", U.S. Patent 8,013,024 (2011).
18. D.D.L. Chung and Sivaraja Muthusamy, "Cement-Graphite Composite Materials for Vibration Damping", U.S. Patent 8,211,227 (2012).
19. D.D.L. Chung and Xiaoqing Gao, "Microstructured high-temperature hybrid material, its composite material and method of making", U.S. Patent 9409823 (issued on Aug. 9, 2016).
20. D.D.L. Chung, "Thixotropic liquid-metal-based fluid and its use in making metal-based structures with or without a mold", U.S. Patent 9993996 B2 (June 12, 2018); China Patent CN 105458254A (April 6, 2016).
21. D.D.L. Chung, "Systems and method for monitoring three-dimensional printing", U.S. Patent 10449721 (Oct. 22, 2019).
22. D.D.L. Chung, "Cement-based material systems and method for self-sensing and weighing", U.S. Patent

10,620,062 B2 (April 14, 2020).

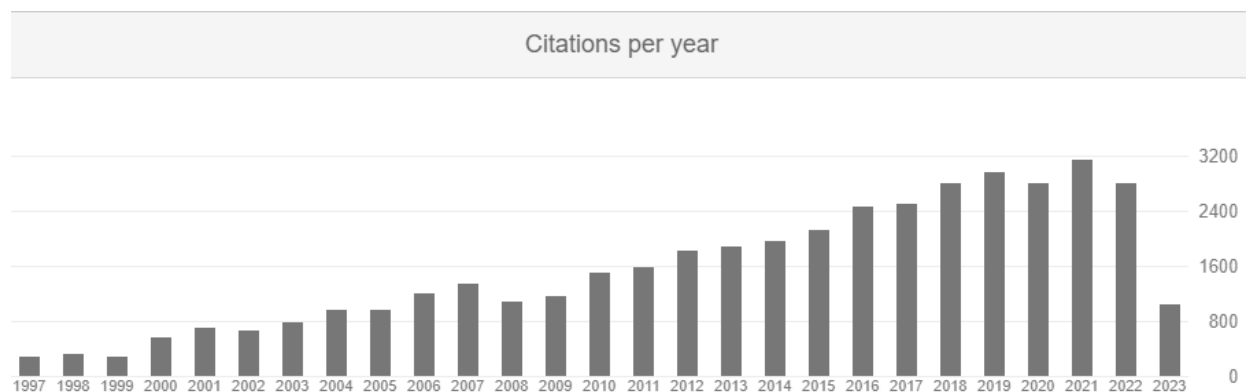
23. D.D.L. Chung, "Electrically conductive electret and associated electret-based power source and self-powered structure", U.S. Patent 11081285 (Aug. 3, 2021).

BOOK CHAPTERS

1. D.D.L. Chung, "Overview of Materials for Electronic Packaging", *Materials for Electronic Packaging*, D.D.L. Chung (Ed.), Butterworth-Heinemann, Boston, MA, 1995, p. 3-39.
2. D.D.L. Chung, "Low Thermal Expansion Composite Materials for Electronic Packaging", *Materials for Electronic Packaging*, D.D.L. Chung (Ed.), Butterworth-Heinemann, Boston, MA, 1995, p. 145-152.
3. D.D.L. Chung, "Conducting Polymer-Matrix Composites", *Materials for Electronic Packaging*, D.D.L. Chung (Ed.), Butterworth-Heinemann, Boston, MA, 1995, p. 153-171.
4. Darold C. Wobschall and D.D.L. Chung, "Ohmmeters", *The Encyclopedia of Electrical and Electronics Engineering*, Vol. 15, pp. 122-123, Wiley, 1999.
5. D.D.L. Chung, "X-Ray Diffraction for Structure Determination", *Encyclopedia of Analytical Chemistry*, R.A. Meyers (Ed.), Wiley, Chichester, UK, 2000, Vol. 15, p. 13347-13384.
6. D.D.L. Chung and C. Zweben, "Composites for Electronic Packaging and Thermal Management", *Comprehensive Composite Materials*, Vol. 6, Pergamon, 2000, p. 701-725.
7. D.D.L. Chung, "Graphite Intercalation Compounds", *Encyclopedia of Materials: Science and Technology*. K.H.J. Buschow, R.W. Cahn, M.C. Flemings, B. Ilshner, E.J. Kramer and S. Mahajan (eds.), Elsevier, Oxford, Vol. 4, p. 3641-3645 (2001).
8. D.D.L. Chung, "Applications of Submicron Diameter Carbon Filaments", *Proc. NATO Advanced Study Institute, NATO Science Series, Series E: Applied Sciences - Vol. 372 (Carbon Filaments and Nanotubes: Common Origins, Differing Applications?, Laszlo P. Biro (Ed.))*, Kluwer Academic Publishers, Dordrecht, 2001, p. 275-288; also in *Nanostructured Carbon for Advanced Applications*, G. Benedek et al. (Ed.), Kluwer, Netherlands, 2001, p. 331-345.
9. Shoukai Wang, Sihai Wen, Victor H. Guerrero and D.D.L. Chung, "Thermoelectric Structural Composites and Thermocouples Using Them" *Materials Research Society Symposium Proceedings*, Volume 691, Issue Thermoelectric Materials 2001: Research and Applications, Materials Research Society, 2002, pp. 177-182.
10. D.D.L. Chung, "Composites, Intrinsically Smart Structures", *Encyclopedia of Smart Materials*, ed. Mel Schwartz, Wiley, 2002, Vol. 1, p. 223-243.
11. D.D.L. Chung, "Carbon-Cement Composites", *World of Carbon 2 (Fibers and Composites)*, Pierre Delhaes (Ed.), Taylor & Francis, 2003, p. 219-241.
12. D.D.L. Chung, "Functional Composite Materials", *Advances in Condensed Matter and Materials Research*, Ed. Francois Gerard, Nova Science Pub., Hauppauge, NY, 2003, p. 89-147.
13. Sihai Wen and D.D.L. Chung, "Fiber Reinforced Cement for Piezoelectricity and Pyroelectricity", ACI Special Publication SP-216, *Innovations in Fiber-Reinforced Concrete for Value*, Ed. N. Banthia, M. Criswell, P. Tatnall and K. Folliard, American Concrete Institute, Farmington Hills, MI, 2003, p. 115-128.
14. D.D.L. Chung, "Multifunctional Polymer-Matrix Structural Composites", Annual Technical Conference - Society of Plastics Engineers, Volume 62nd, Issue Vol. 2, Society of Plastics Engineers, 2004, pp.1410-1414.
15. D.D.L. Chung, "Composite Materials", *Kirk-Othmer Encyclopedia of Chemical Technology*, 5th Ed., Wiley, 2004.
16. D.D.L. Chung, "Composite Materials", *Kirk-Othmer Concise Encyclopedia of Chemical Technology*, 5th Ed., Wiley, 2007.
17. D.D.L. Chung, G. Song, N. Ma and H. Gu, "Smart Materials and Structures", *High Performance Construction Materials*, Caijun Shi and Y. L. Mo (eds.), Vol. 1 of Book Series "Engineering Materials for Technological Needs", World Scientific Pub., Singapore, 2008. Chinese translation, Chongqing University Press, China, 2011.
18. D.D.L. Chung, "Sensors in Composites", *Wiley Encyclopedia of Composites*, 2nd Ed., edited by Luigi Nicolais, Assunta Borzacchiello and Stuart M. Lee. Wiley-Interscience, 2014.
19. D.D.L. Chung, "Composite Materials", *Kirk-Othmer Encyclopedia of Chemical Technology*, 6th Ed., Wiley, 2016 (in press).
20. D.D.L. Chung, "Graphite Intercalation Compounds", *The Reference Module in Materials Science and Engineering*, Saleem Hashmi, Editor, Elsevier, 2016.
21. D.D.L. Chung, "Self-Sensing Structural Composites in Aerospace Engineering", *Advanced composite materials for aerospace engineering: processing, properties and applications*, Sohel Rana and Raul Figueiro, Editors, Woodhead Pub., Elsevier, 2016, Ch. 10, p. 295-331.
22. D.D.L. Chung, "Carbon Fibers", *ASM Handbook*, Volume 21, 2016.
23. D.D.L. Chung, in, *Successful Women Ceramic and Glass Scientists and Engineers: 100 Inspirational Profiles*, L.D. Madsen, Wiley, 2016, ISBN: 978-1-118-73360-8.
24. D.D.L. Chung, "Carbon-Matrix Composites", *Encyclopedia of Materials: Technical Ceramics and Glasses*, Elsevier, 2020.
25. D.D.L. Chung, "Sensing Materials: Self-Sensing Materials", *Encyclopedia of Sensors and Biosensors*, Elsevier, 2022.

ARCHIVAL PEER-REVIEWED INTERNATIONAL JOURNAL PAPERS

Google Scholar: h-index = 109, 43,297 citations, annual citations reaching 3,154 (as viewed on April 19, 2023). The number of citations over the years is shown in the chart below, as obtained from Google Scholar.



618 archival peer-reviewed international journal papers categorized by material type are listed below. Only published peer-reviewed journal papers are listed.

CARBON (171 journal papers)

1. D.D.L. Chung and M.S. Dresselhaus, "Magnetoreflexion Study of Graphite Intercalated with Bromine," Solid State Comm. 19, 227 (1976).
2. D.A. Platts, D.D.L. Chung and M.S. Dresselhaus, "Far-Infrared Magnetoreflexion Studies of Graphite Intercalated with Bromine," Phys. Rev. B15, 1087 (1977).
3. D.D.L. Chung and M.S. Dresselhaus, "Magneto-Optical Studies of Graphite Intercalation Compounds," (invited paper), Physica 89B, 131 (1977).
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2. Shoukai Wang and D.D.L. Chung, "Self-Monitoring of Strain in Silicon Carbide Whisker Reinforced Silicon Nitride," Smart Mater.Struct.6, 199-203 (1997).
3. Shuang Lu and D.D.L. Chung, "Viscoelastic behavior of silica particle compacts under dynamic compression", Journal of Materials in Civil Engineering 26(3), 551-553 (2014).
4. Shuang Lu and D.D.L. Chung, "Viscoelastic behavior of silica fume in the absence of a binder", ACI Materials J. 112(1), 137-146 (2015).
5. Shuang Lu and D.D.L. Chung, "Effect of organic intercalation on the viscoelastic behavior of clay", J. Mater. Sci. 49(8), 3189-3195 (2014).
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7. Xinghua Hong, Daojun Wang and D.D.L. Chung, "Boron nitride nanotube mat as a low-k dielectric material with relative dielectric constant ranging from 1.0 to 1.1", J. Electronic Mater.45(1), 453-461 (2016).
8. Xinghua Hong, Daojun Wang and D.D.L. Chung, "Strong Viscous Behavior Discovered in Nanotube Mats, as Observed in Boron Nitride Nanotube Mats", Composites, Part B, B91, 56-64 (2016).
9. D.D.L. Chung, "Comment on "Piezoresistive Effect in SiOC Ceramics for Integrated Pressure Sensors", J. Am. Ceramic Soc., 94(1), 289 (2011).
10. Yong Fu and D.D.L. Chung, "Coagulation of Oil in Water Using Sawdust, Bentonite and Calcium Hydroxide to Form Floatable Sheets", Appl. Clay Sciences 53, 634-641 (2011).
11. Tianlei Sun and D.D.L. Chung, "Coagulation of Oil in Water Using Sawdust and Bentonite and the Formation of a Floating Coagulated Material", J. Environmental Engineering 139, 1470-1481 (2013).
12. Sihai Wen and D.D.L. Chung, "Effect of Stress on the Dielectric Constant of Alumina", J. Electron. Packaging 127(3), 235-236 (2005).
13. Shoukai Wang and D.D.L. Chung, "Piezoresistivity in Silicon Carbide Fibers", J. Electroceramics 10, 147-152 (2003).
14. Zongrong Liu and D.D.L. Chung, "Comparative Study of Electrically Conductive Thick Films With and Without Glass", J. Electron. Mater. 33(3), 194-202 (2004).
15. Sihai Wen and D.D.L. Chung, "Effect of Stress on the Dielectric Constant of Alumina", J. Electron. Packaging 127, 235-236 (2005).
16. Yunsheng Xu, Xiangcheng Luo and D.D.L. Chung, "Sodium Silicate Based Thermal Pastes for High Thermal Contact Conductance", J. Electronic Packaging 122(2), 128-131 (2000). Erratum: J. Electron. Packaging123, 159 (2001).
17. J.A. Fernando and D.D.L. Chung, "Pore Structure and Permeability of an Alumina Fiber Filter Membrane for Hot Gas Filtration", J. Porous Materials 9(3), 211-219 (2002).
18. J.A. Fernando and D.D.L. Chung, "Improving an Alumina Fiber Filter Membrane for Hot Gas Filtration using an Acid Phosphate Binder", J. Mater. Sci. 36(21), 5079-5085 (2001).
19. J.A. Fernando and D.D.L. Chung, "Thermomechanical Properties of Alumina Fiber Membrane", Ceramics Int. 31, 453-460 (2005).

METALS (19 journal papers)

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2. D.D.L. Chung and Kairong Shi, "Sensing the stress in steel by capacitance measurement", Sensors and Actuators A 274, 244-251 (2018).
3. Xiang Xi and D.D.L. Chung, "Piezoresistivity and piezoelectricity discovered in aluminum, with relevance to structural self-sensing", Sensors and Actuators A 289, 144-156 (2019).
4. Kairong Shi and D.D.L. Chung, "Unprecedented capacitance-based nondestructive evaluation of steels", J. Mater. Eng. Perf. 28(5), 2573-2587 (2019).
5. Xiang Xi and D.D.L. Chung, "Electret, piezoelectret and piezoresistivity discovered in steels, with application to structural self-sensing and structural self-powering", Smart Mater. Struct. 28(7) 075028 (18 pp) (2019).
6. Xiang Xi and D.D.L. Chung, "Piezoelectret-based and piezoresistivity-based stress self-sensing in steel beams under flexure", Sensors Actuators A 301, 111780 (2020).
7. D.D.L. Chung and Murat Ozturk. Radio-wave absorption by aluminum and its dependence on the absorption distance. J. Mater. Sci. 56(15), 9263-9273 (2021).
8. Xiang Xi and D.D.L. Chung, "Piezoresistivity and piezoelectricity, dielectricity discovered in solder", J. Mater. Sci.: Mater. Electronics 30(5), 4462-4472 (2019).
9. Wenyi Yang and D.D.L. Chung. Electric polarization and depolarization of solder, and their effects on electrical

- conduction. *J. Mater. Sci.: Mater. Electronics* 32(5), 6214-6227 (2021). Correction: *Journal of Materials Science: Materials in Electronics*, 32(10), 14113-14114 (2021).
10. Wenyi Yang and D.D.L. Chung. Effect of temperature on the electrical conduction and dielectric behavior of solder. *J. Mater. Sci.: Mater. Electronics* 32(5), 6511-6519 (2021).
 11. Wenyi Yang and D.D.L. Chung. Effect of the cooling rate in solidification on the electrical behavior of solder. *J. Mater. Sci.: Mater. Electronics* 32(6), 7867-7874 (2021).
 12. Wenyi Yang and D.D.L. Chung. First report of the ferroelectric behavior of a metal, as shown for solder. *J. Mater. Sci.: Mater. Electronics* 32(12), 16979-16989 (2021).
 13. Murat Ozturk and D.D.L. Chung. Radio-wave shielding behavior of steel structures. *J. Electromagnetic Waves and Applications* 35(11), 1407-1419 (2021).
 14. Xiang Xi and D.D.L. Chung. Effects of cold work, stress and temperature on the dielectric behavior of copper. *Mater. Chem. Phys.* 270, 124793 (2021). <https://authors.elsevier.com/a/1dFyavn2Lxwt9>
 15. Wenyi Yang and D.D.L. Chung. Electret behavior discovered in solder, specifically tin-silver. *J. Mater. Sci.: Mater. Electronics* 32(14), 19145-19156 (2021).
 16. Wenyi Yang and D.D.L. Chung. Effect of water on the dielectric behavior of solder. *J. Mater. Sci.: Mater. Electronics* 32, 22196–22204 (2021). <https://rdcu.be/crPnY>
 17. Garrett C. Thomas and D.D.L. Chung. Dielectric behavior of an electrically conductive metal-particle thick film. *J. Electron. Mater.* 51, 3005–3013 (2022). <https://rdcu.be/cIIO1>
 18. D.D.L. Chung, Xiang Xi. New concept of electret-based capacitance, as shown for solder and other conductors. *J. Mater. Sci.: Materials in Electronics* 33, 27022–27039 (2022). <https://rdcu.be/cYQHX>
 19. D.D.L. Chung, Xiang Xi. Introducing solder-based electronics, with solder functioning as resistor, capacitor and power source. *J. Mater. Sci.: Materials in Electronics* 24, 131 (2023). <https://rdcu.be/c3EBm>

POLYMERS (2 journal papers)

1. Wenhai Fu and D.D.L. Chung, "Vibration Reduction Ability of Polymers, Particularly Polymethylmethacrylate and Polytetrafluoroethylene", *Polymers & Polymer Composites* 9(6), 423-426 (2001).
2. Yu-Cheng Liu, Yasuhiro Aoyagi and D.D.L. Chung, "Development of Epoxy-Based Electrets", *J. Mater. Sci.* 43(5), 1650-1663 (2008).

OTHER TOPICS (21 journal papers)

1. D.D.L. Chung, "Electrical Behavior of Solids," *J. Educational Modules for Mat. Sci. Eng.* 2, 747 (1980).
2. D.D.L. Chung, "Materials for Electromagnetic Interference Shielding", *J. Materials Eng. Performance* 9(3), 350-354 (2000).
3. D.D.L. Chung, "Thermal Interface Materials", *J. Mater. Eng. Performance* 10(1), 56-59 (2001).
4. D.D.L. Chung, "Materials for Thermal Conduction", *Applied Thermal Engineering* 21 (ER16), 1593-1605 (2001).
5. Xiangcheng Luo, Yunsheng Xu and D.D.L. Chung, "Thermal Stability of Thermal Interface Pastes Evaluated by Thermal Contact Conductance Measurement", *J. Electronic Packaging* 123(3), 309-311 (2001).
6. Xiangcheng Luo and D.D.L. Chung, "Effect of the Thickness of a Thermal Interface Material (Solder) on Heat Transfer Between Copper Surfaces", *Int. J. Microcircuits Electronic Packaging* 24(2), 141-147 (2001).
7. D.D.L. Chung, "Materials for Vibration Damping", *J. Mater. Sci.* 36(24), 5733-5738 (2001).
8. D.D.L. Chung, "Composites Get Smart", *Materials Today* 5(1), 30-35 (2002).
9. Taejin Kim and D.D.L. Chung, "Thermoelectric Behavior of Solder", *J. Electronic Packaging* 125(1), 161-162 (2003).
10. Junhua Wu and D.D.L. Chung, "Pastes for Electromagnetic Interference Shielding", *J. Electron. Mater.* 34(9), 1255-1258 (2005).
11. Taejin Kim and D.D.L. Chung, "Mats and Fabrics for Electromagnetic Interference Shielding", *J. Mater. Eng. Perf.* 15(3), 295-298 (2006).
12. D.D.L. Chung, "Advances in Thermal Interface Materials", *Advancing Microelectronics* 33(4), 8-11 (2006).
13. Qiaoli Meng, Yibadan Kenayeti and D.D.L. Chung, "Battery in the form of a soil-matrix composite", *J. Energy Engineering*, 141(3), 04014013 (2015); online first (2012).
14. D.D.L. Chung, "Mildred S. Dresselhaus (1930-2017)", *Nature* 543, 316 (2017).
15. Robert H. Hurt, D.D.L. Chung, Mauricio Terrones, Katsumi Kaneko, Peter Thrower, Morinobu Endo, Hui-Ming Cheng, Michael Strano. Mildred S. Dresselhaus (1930 – 2017) – A Tribute from the Carbon Journal. *Carbon* 119, 573-577 (2017).
16. D.D.L. Chung, "Thermal interface materials", *J. Electron. Mater.* 49(1), 268-270 (2020).
17. D.D.L. Chung. Materials for electromagnetic interference shielding (Feature Article). *Mater. Chem. Phys.* 255, 123587 (2020).
18. D.D.L. Chung. Pitfalls and methods in the measurement of the electrical resistance and capacitance of materials. *J. Electron. Mater.* 50(2), 6567-6574 (2021).
19. D.D.L. Chung. Pitfalls in electromagnetic skin-depth determination. *J. Electron. Mater.* 51, 1893-1899 (2022).
20. D.D.L. Chung. Performance of thermal interface materials. *Small* 18(16), 2200693 (2022).

21.D.D.L. Chung. Pitfalls in piezoresistivity testing. J. Electronic Mater. 51, 5473-5481 (2022).

TEACHING WORK

A. Courses developed and given

MAE 435/535 Principles of Material Design

MAE 438/538 Smart Materials

MAE 489/589 Experimental Methods in Materials Science and Engineering

B. Ph.D. graduates with Dissertations

The research topic of each graduate can be found in the publication list, as each graduate has at least a few papers published.

Carnegie-Mellon University (3 Ph.D. graduates, with Chung as the Major Advisor)

K.K. Bardhan, 1980

S.H. Anderson, 1984

Taeil Kim, 1988

University at Buffalo (33 Ph.D. graduates, with Chung as the Major Advisor)

Chi-Ting Ho, 1990

Jeng-Maw Chiou, 1991

Lin Li, 1993

Shy-Wen Lai, 1993

Pu-Woei Chen, 1994

Nagarajan Sridhar, 1995

Mingguang Zhu, 1995

Christine A. Frysz, 1995

Xiaoping Shui, 1996

Pay Yih, 1996

Xiaojun Wang, 1997

Jiangyuan Hou, 1997

Xuli Fu, 1997

Xiangcheng Luo, 2000

Zhen Mei, 2001

Weiming Lu, 2001

Joseph A. Fernando, 2001

Yunsheng Xu, 2002

Shoukai Wang, 2002

Sihai Wen, 2003

Jingyao Cao, 2004

Zongrong Liu, 2004

Chia-Ken Leong, 2004

Junhua Wu, 2008

Yasuhiro Aoyagi (name changed to Yasuhiro Yamada), 2007

Chuangang Lin, 2010

Seungjin Han, 2013

Daojun Wang, 2013

Po-Hsiu Chen, 2015

Andi Wang, 2016

Yoshihiro Takizawa, 2017

Asma A. Eddib, 2019

Wenyi Yang, 2021

Xiang Xi, 2022

Total number of Ph.D. graduates = 37

C. M.S. graduates with Theses

Carnegie-Mellon University (1 graduate with Chung as the Major Professor)

J.S. Culik, 1984

University at Buffalo (27 graduates with Chung as the Major Professor)

Scott W. Park, 1995
Martin Segiet, 1998
Paul T. King, 1999
Victor H. Guerrero, 2001
Wenhai Fu, 2002
Kyu-Dong Kim, 2002
Chia-Ken Leong, 2003
Dwayne A. Gordon, 2003
Timothy A. Howe, 2006
Ricky Chan, 2006
Yuan-Chan Hsu, 2007
Daojun Wang, 2007
Yu-Cheng Liu, 2008
Chiung-Yi Huang, 2008
Chi-Hao Tang, 2008
Jing Chen, 2008
David G. Meehan, 2010
Qiaoli Meng, 2010
Kesong Hu, 2011
Parisa Pour Shahid Saeed Abadi, 2011
Tianlei Sun, 2013
Munish Sharma, 2015
Morteza Moalleminejad, 2015
Allipati Delixiati, 2015
Adeel Ul Haq Qurishi, 2017
Wenyi Yang, 2017
Michael Sullivan, 2018

D. M.E. graduates with Projects

University at Buffalo (with Chung as the Major Professor)

Yinhui Wang, 1998
Zeng-qiang Shi, 1999

GRANTS

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Department of Transportation (DOT)

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As Co-Principal Investigator (8 grants totaling \$1,478,466)

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As PI: \$3,600,000 (NSF)