

CURRICULUM VITA

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

<https://www.amacad.org/person/deborah-chung>

<https://www.youtube.com/watch?v=sWbswrke32E&t=284s> (44 min, on Chung's life in science)

<https://www.buffalo.edu/news/releases/2023/04/025.html>

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

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

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

<https://www.youtube.com/watch?v=INZrNhbDK9c>

https://www.youtube.com/watch?v=u_GGEbotQAM

<https://www.webofscience.com/wos/author/record/675681>

https://magazine.caltech.edu/post/meet-caltechs-2025-distinguished-alumni?utm_medium=email&utm_campaign=magazine-fall25&utm_source=caltechmagazine&utm_content=&utm_term=

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 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. Development of inductance-based self-sensing, with applications including fiber-tow twist-level sensing, strain sensing, damage sensing, and surface roughness sensing.
 6. First report of structural capacitors (i.e., capacitors in the form of structural materials).
 7. 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), and with elucidation of the dielectric behavior in terms of the carrier-atom interaction (carrier meaning the mobile charges) and polarization connectivity.
 8. 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

- *SUNY Distinguished Professor of Mechanical and Aerospace Engineering (2024-present)
- *Professor of Mechanical and Aerospace Engineering (1986-2024)
- *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

Distinguished Alumni Award, Caltech, 2025.

Distinguished Speaker, College of Engineering and Physical Sciences, University of Wyoming, Laramie, WY, April 28, 2025.

Ranked 92nd in the world in the field of Engineering (scholargps.com, 2025)

Ranked 11th in the world in the field of Mechanical Engineering (scholargps.com, 2025)

Ranked 3rd in the world in the field of Structural Material (scholargps.com, 2025)

Ranked 1st in the world in the field of Carbon Fibers (scholargps.com, 2025)

Ranked 1st in the world in the field of Electromagnetic Interference (scholargps.com, 2025)

https://scholargps.com/scholars/82464821147732/ddl-chung?e_ref=8d6bbf3a7eba34110af1

Deborah Chung and Lan Wong Endowed Scholarship Fund, California Institute of Technology, initiated in 2025.

PAIR Distinguished Lecturer, Hong Kong Polytechnic University, Hong Kong, Dec. 17, 2024.

Certificate of Special Congressional Recognition, in recognition of receiving the University at Buffalo President's Medal, U.S. Congress, May 2024.

President's Medal, University at Buffalo, The State University of New York, 2024.

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

Feature article "Materials for electromagnetic interference shielding" by Chung and published in Materials Chemistry and Physics is the third most cited Materials Chemistry and Physics article in the last two years (2020-2022).

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

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, every year since its inception in 2018)

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. Teeter 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.

First woman engineering graduate of California Institute of Technology, 1973.

Josephine de Karman Fellowship (1972-73) for graduate and senior undergraduate students of exceptional ability.

MEMBERSHIPS

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

Fellow, American Carbon Society, 2001-present; Member, 1979-present; Advisory Board member, 1999-2005;

Member, American Ceramic Society, 1989-1990, 1994, 2018-

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, 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-.
- * Editor, Book Series on *Engineering Materials for Technological Needs*, World Sci. Pub., 2005-.
- * 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 (2017-2025); Journal of Materials Science: Composites (rebranded, 2025-).
- * 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.
 - * Guest Editor, Special Issue on Carbon Films in memory of Professor Millie Dresselhaus, Materials Chemistry and Physics (2022-2025).
 - *Member, International Editorial Board, Composites Science and Technology (2024-).
 - *Deborah D.L. Chung YouTube channels (2022-). Example:
<https://www.youtube.com/watch?v=sWbswrke32E&t=284s> (44 min, on Chung's life in science)

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, 2019, 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; Vol. 3, 2023.
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.
5. D.D.L. Chung, *Carbon films: Development and applications*, Special Issue, Materials Chemistry and Physics (journal), Elsevier, 2025.

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).

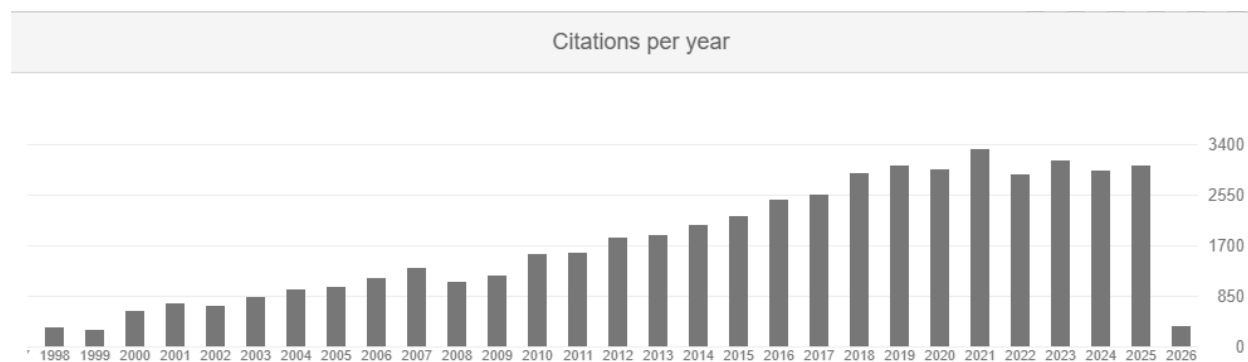
BOOK CHAPTERS

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.
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The number of citations for each year over the years is shown in the chart below, as obtained from Google Scholar.



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