Dr. Chris Daft

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SUMMARY

- Award winning, Oxford Educated scientist whose areas of knowledge span imaging, AI, semiconductors, MEMS, biomedical engineering, sensors, signal processing and image processing.
- Experience in industries/applications including medical devices, wearables, imaging, consumer electronics, biometric security, and electrical power delivery.
- 5 trial testimonies and 21 depositions.
- Serial inventor holding 29 patents with 18 filed applications.
- Diverse technical consulting experience with multinationals such as GE, Medtronic, Fujifilm, Samsung, Siemens, and many start-ups.
- Well-published in peer-reviewed scientific journals.
- Winner of grants from National Institute of Health (NIH) and DARPA.
- Three years at University of Illinois teaching electrical and computer engineering.
- IEEE Senior Member since 2004.

EDUCATION

- D. Phil. (equal to Ph.D.) in Materials Science, Oxford University, UK, 1987. Thesis title: *Acoustic microscopy of biological tissue.*
- M.A. in Physics, Oxford University, UK, 1985.
- B.A. in Physics with 1st class honors, Oxford University, UK**,** 1984.

HIGHLIGHTS OF RECENT WORK

- Chief Technology Officer of a neurotech startup.
- System design for a wearable mental health treatment device using AI-guided neuromodulation and physiological measurement.
- System design for a wearable cancer monitoring device.
- Portable point-of-care imaging (research supported by a grant to River Sonic Solutions from the National Institutes of Health).
- Design of beam formation and image reconstruction techniques for transcranial imaging and treatment (with the University of Arizona).

- Acoustics and transducer design for medical and industrial applications (with several consulting clients).
- Design of MEMS (micro-electro-mechanical systems) transducers, signal processing and front-end electronics for pediatric otitis diagnosis.

HONORS AND AWARDS

- *Member*, BrainMind Ecosystem, September 2024. This invitation-only organization reflects leadership in the field of brain science. BrainMind's activities accelerate breakthroughs in neuroscience and translation from the lab to humanity.
- *Senior Key Expert*, Siemens AG, February 2009: Siemens defines the Key Expert position as "a career path for key technology experts analogous to that for our top managerial talents."
- *Willis R. Whitney Technical Achievement Award*, GE Global Research, August 2000: For participating in the development of a Six-Sigma software toolkit, which was widely deployed within GE.
- *Six-Sigma Certified Green Belt*, GE Global Research, April 1998: A certified Green Belt at GE has taken classes and completed several projects resulting in cost savings for the company. In my case these involved Design for Six-Sigma (DFSS).
- *Dushman Award*, GE Global Research, June 1994: Highest-ranking team award for contributions to the introduction of GE's first premium ultrasound product, the LOGIQ 700.

VOLUNTEER WORK

- *Member of the Board of Directors*, IEEE-CNSV (Consultants' Network of Silicon Valley), 2017-2019. IEEE-CNSV is the Silicon Valley chapter of the IEEE-USA Consultants' Network. It brings together consultants, clients, and other interested parties to exchange ideas about electrical, electronic and software engineering. I served as the Secretary of this organization for two years.
- *Project Manager*, Keizai Silicon Valley, 2013-2021. KSV is a non-profit business and professional networking organization. It provides a venue for showcasing specialists with expertise on issues critical to the success of entrepreneurs and companies doing business with Japan and the U.S.
- *Member of Technical Program Committee*, IEEE International Ultrasonics Symposium, 2004-2022. This committee is responsible for selection of the technical content of the IEEE International Ultrasonics Symposium.
- *Instructor*, 2025 and 2026 IEEE International Ultrasonics Symposia. Co-teaching a course titled "Bridging Research and Industry in Ultrasound: Practical Insights for Emerging Innovators."

ISSUED PATENTS

1. Wearable closed loop TUS system: United States Patent 12,458,817
2. Cranial acoustic coupling apparatus and methods: United States Patent 12,654,038
3. Receive-side beam forming for an ultrasonic image sensor: European Patent EP3353708B1
4. Methods, devices and systems for inducing collagen regeneration: United States Patent 11,172,978
5. Receive-side beam forming for an ultrasonic image sensor: United States Patent 10,067,229
6. Ultrasonic device and operation method therefor: European Patent EP3311752B1
7. Piezoelectric transducer device for configuring a sequence of operational modes: United States Patent 10,022,751
8. Redistribution layer in an ultrasound diagnostic imaging transducer: United States Patent 9,274,088
9. Switch for aperture control in medical diagnostic ultrasound imaging: United States Patent 8,795,182
10. Volume mechanical transducer for medical diagnostic ultrasound: United States Patent 8,647,279
11. Aperture synthesis using cMUTs: United States Patent 8,641,628
12. Multi-dimensional CMUT array with integrated beam formation: United States Patent 8,465,431
13. Piezoelectric and CMUT layered ultrasound transducer array: United States Patent 8,277,380
14. Ultrasound imaging transducer array for synthetic aperture: United States Patent 7,963,919
15. Apparatus for two-dimensional transducers used in three-dimensional ultrasonic imaging: United States Patent 7,824,338
16. Method and apparatus for improving the performance of capacitive acoustic transducers using bias polarity control and multiple firings: United States Patent 7,780,597
17. Apparatus for two-dimensional transducer used in three-dimensional ultrasonic imaging: United States Patents 7,719,166 & 7,679,263
18. Electric circuit for tuning a capacitive electrostatic transducer: United States Patent 7,670,290
19. Microfabricated ultrasonic transducer array for 3-D imaging and method of operating the same: United States Patent 7,618,373
20. Apparatus for two-dimensional transducers used in three-dimensional ultrasonic imaging: United States Patent 7,508,113
21. Microfabricated ultrasonic transducers with bias polarity beam profile control and method of operating the same: United States Patent 7,087,023

22. System and method for statistical design of ultrasound probe and imaging system: United States Patent 7,006,955
23. Method and system for conducting medical imaging transactions: United States Patent 6,931,270
24. Ultrasound imaging system having post-beamformer signal processing using deconvolution algorithm: United States Patent 6,245,016
25. Ultrasound imaging system with dynamic window function generator: United States Patent 5,817,023
26. Focused ultrasound surgery system guided by ultrasound imaging: United States Patent 5,769,790
27. Method for adaptively filtering doppler signals using a complex time domain filter: United States Patent 5,445,156
28. Color flow imaging system utilizing a time domain adaptive wall filter: United States Patent 5,349,524
29. Ultrasound imaging system with dynamic window function: United States Patent 5,345,939

PENDING PATENT APPLICATIONS

USPTO filing numbers for the initial provisional applications are listed. Some of these have been split into multiple nonprovisional applications after USPTO Office Actions.

1. US 63/435,158 – Image guided therapeutic
2. US 63/516,463 – Physiological measurement
3. US 63/516,465 – EEG shielding
4. US 63/580,071 – Ultrasound aberration correction
5. US 63/589,928 – Treatment system
6. US 63/590,716 – Ultrasonic device
7. US 63/607,032 – Acoustic coupling device
8. US 63/617,605 – Treatment safety method
9. US 63/554,004 – AI guided therapeutic
10. US 63/599,816 – Blockchain protected therapeutic
11. US 63/567,382 – AI centric treatment
12. US 63/582,162 – Closed loop treatment
13. US 63/586,735 – Stroke treatment
14. US 63/572,577 – Transcranial parameters
15. US 63/637,810 – Mechanical design of medical device
16. US 63/640,591 – Measuring modulation efficacy
17. US 63/650,236 – Transcranial headset
18. US 63/685,512 – Physiologically controlled treatment

ACADEMIC PUBLICATIONS

Invited Papers

1. Daft, C.M.W., "Conformable transducers for large-volume, operator-independent imaging," Ultrasonics Symposium, 2010 IEEE, pp.798-808, 11-14 Oct. 2010
2. Daft, C.; Wagner, P.; Bymaster, B.; Panda, S.; Patel, K.; Ladabaum, I., "cMUTs and electronics for 2D and 3D imaging: monolithic integration, in-handle chip sets and system implications," Ultrasonics Symposium, 2005 IEEE, vol.1, pp.463-474, 18-21 Sept. 2005
3. Daft, C.M.W., "Neural networks for image analysis," Ultrasonics Symposium, 1990. Proceedings., IEEE 1990, pp.1425-1433 vol.3, 4-7 Dec 1990

Other Papers

4. Reznik, S.; Sanguinetti, J.; Tyler, W.; Daft, C.; Allen, J., “A Double-Blind Pilot Study of Transcranial Ultrasound (TUS) as a Five-Day Intervention: TUS Mitigates Worry among Depressed Participants,” Neurology, Psychiatry and Brain Research 37C, 60-66 (2020)
5. Sanguinetti, J.; Hameroff, S.; Smith, E.; Sato, T.; Daft, C.; Tyler, W.; Allen, J., “Transcranial Focused Ultrasound to the Right Prefrontal Cortex Improves Mood and Alters Functional Connectivity in Humans,” Frontiers in Human Neuroscience, vol. 14, 52 (2020)
6. Nistorica, C.; Latev, D.; Gardner, D.; Imai, D. and Daft, C., "Characterization of a 3D-MEMS piezoelectric transducer for portable imaging systems," 2015 IEEE International Ultrasonics Symposium (IUS), Taipei, 2015, pp. 1-4
7. Daft, C.; Brueske, D.; Wagner, P.; Liu, D., "A Matrix Transducer Design with Improved Image Quality and Acquisition Rate," Ultrasonics Symposium, 2007 IEEE, pp. 411-415, Oct. 2007
8. Daft, C.; Panda, S.; Wagner, P.; Ladabaum, I., "Two Approaches to Electronically Scanned 3D Imaging Using cMUTs," Ultrasonics Symposium, 2006. IEEE, pp. 685-688, Oct. 2006
9. Liu, D.; Brueske, D.; Willsie, T.; Daft, C., "Sigma-delta dynamic receive beamforming," Ultrasonics Symposium, 2008. IEEE, pp. 1270-1273, Nov. 2008
10. Daft, C.; Wagner, P.; Bymaster, B.; Panda, S.; Patel, K.; Ladabaum, I., "cMUTs and electronics for 2D and 3D imaging: monolithic integration, in-handle chip sets and system implications," Ultrasonics Symposium, 2005 IEEE, vol.1, pp. 463-474, Sept. 2005
11. Daft, C.; Calmes, S.; da Graca, D.; Patel, K.; Wagner, P.; Ladabaum, I., "Microfabricated ultrasonic transducers monolithically integrated with high voltage electronics," Ultrasonics Symposium, 2004 IEEE, vol. 1, pp. 493-496, Aug. 2004

12. Daft, C.; Wagner, P.; Panda, S.; Ladabaum, I., "Elevation beam profile control with bias polarity patterns applied to microfabricated ultrasound transducers," Ultrasonics, 2003 IEEE Symposium on, pp. 1578-1581 Vol. 2, Oct. 2003
13. Daft, C.M.W.; Leue, W.M.; Thomenius, K.E.; Macdonald, M.C.; Odegaard, L.A., "Comprehensive imager simulation for improved acoustic power control," Ultrasonics Symposium, 1999. Proceedings. IEEE, vol. 2, no., pp. 1571-1575
14. Wildes, D.G.; Chiao, R.Y.; Daft, C.M.W.; Rigby, K.W.; Smith, L.S.; Thomenius, K.E., "Elevation performance of 1.25D and 1.5D transducer arrays," Ultrasonics, Ferroelectrics, and Frequency Control, IEEE Transactions on, vol. 44, no. 5, pp. 1027-1037, Sept. 1997
15. Daft, C.M.W.; Engeler, W.E., "Windowing of wide-band ultrasound transducers," Ultrasonics Symposium, 1996. Proceedings., IEEE, vol. 2, pp. 1541-1544, Nov 1996
16. Daft, C.M.W.; Wildes, D.G.; Thomas, L.J.; Smith, L.S.; Lewandowski, R.S.; Leue, W.M.; Rigby, K.W.; Chalek, C.L.; Hatfield, W.T., "A 1.5D transducer for medical ultrasound," Ultrasonics Symposium, 1994. Proceedings., IEEE, vol. 3, pp. 1491-1495, Oct. 1994
17. Daft, C.M.W.; Siddiqi, T.A.; Fitting, D.W.; Meyer, R.A.; O'Brien, W.D., Jr., "In-vivo fetal ultrasound exposimetry," Ultrasonics, Ferroelectrics, and Frequency Control, IEEE Transactions on, vol. 37, no. 6, pp. 501-505, Nov. 1990
18. Daft, C.M.W.; Smith, L.S.; O'Donnell, M., "Beam profiles and images from two-dimensional arrays," Ultrasonics Symposium, 1990. Proceedings., IEEE, pp.775-779 vol. 2, Dec 1990
19. Conrath, B.C.; Daft, C.M.W.; O'Brien, W.D., Jr., "Applications of neural networks to ultrasound tomography," Ultrasonics Symposium, 1989. Proceedings., IEEE 1989, pp.1007-1010 vol. 2, Oct 1989
20. Daft, C.M.W.; Siddiqi, T.A.; Fitting, D.W.; Meyer, R.A.; O'Brien, W.D., Jr., "In-vivo fetal ultrasound exposimetry," Ultrasonics Symposium, 1989. Proceedings., IEEE 1989, pp.1053-1056 vol.2, Oct 1989
21. Weaver, J.M.R.; Daft, C.M.W.; Briggs, G.A.D., "A quantitative acoustic microscope with multiple detection modes," Ultrasonics, Ferroelectrics, and Frequency Control, IEEE Transactions on, vol. 36, no. 5, pp. 554-560, Sept. 1989
22. Daft, C.M.W.; Briggs, G.A.D., "Wideband acoustic microscopy of tissue," Ultrasonics, Ferroelectrics, and Frequency Control, IEEE Transactions on, vol.36, no. 2, pp. 258-263, March 1989
23. Daft, C. M. W.; Briggs, G. A. D., “The elastic microstructure of various tissues,” The Journal of the Acoustical Society of America, 85, 416-422 (1989)
24. Daft, C. M. W.; Briggs, G. A. D.; O’Brien, W. D., Jr. “Frequency dependence of tissue attenuation measured by acoustic microscopy” The Journal of the Acoustical Society of America, 85, 2194-2201 (1989)
25. Daft, C.M.W.; Briggs, G.A.D.; O'Brien, W.D., Jr., "Frequency dependence of tissue attenuation measured by acoustic microscopy," Ultrasonics Symposium, 1988 Proceedings., IEEE, pp. 971-974 vol.2, 2-5 Oct 1988

26. Daft, C.M.W.; Briggs, G. A. D., “Wideband acoustic microscopy of tissue,” The Journal of the Acoustical Society of America, 83, S110-S110 (1988)
27. Bamber, J.C.; Daft, C., “Adaptive filtering for reduction of speckle in ultrasonic pulse-echo images,” Ultrasonics 24(1), 41-44 (1986)

PROFESSIONAL MEMBERSHIPS

- *IEEE Consultants Network of Silicon Valley*: member from 2012 to Present.
- *IEEE Senior Member*: 2004 to Present. The Institute of Electrical and Electronic Engineers is the world’s largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity.

EMPLOYMENT EXPERIENCE

RIVER SONIC SOLUTIONS, LLC

Principal, Tucson, AZ: 2012-present

Technical Consulting and Expert witness practice in: Imaging, especially Medical Imaging; Patents; Ultrasound; Electronics; Transducers; Application Specific Integrated Circuits (ASIC); Micro-electro-mechanical systems (MEMS); FDA approval of medical devices; Signal Processing; Design for Six-Sigma (DFSS); Semiconductors/ICs; Biometric security; Surgical Tissue Ablation; Tomography; Parallel Computing; Minimally Invasive Surgical Guidance; Wearable Devices.

SANMAI TECHNOLOGIES, PBC

Chief Technology Officer, Sunnyvale, CA: 2020-2025

Responsible for technology at Public Benefit Corporation using transcranial ultrasound for non-pharmaceutical treatment of mental illness.

CEPHASONICS, INC. (previously Samplify)

Chief Scientist, Santa Clara, CA: 2011-2013

- Responsible for technical direction of a start-up seeking to commoditize front-end and beam formation electronics.
- Advised CEO on all technical matters; also deeply involved in angel and VC fund-raising.
- Extensive customer interaction: marketed products to imaging and non-traditional customers.

SIEMENS HEALTHCARE, ULTRASOUND DIVISION

Senior Manager, Engineering, Mountain View, CA: 2005-2011

- Delivered 3 ASICs on tight schedule to support new Silicon Ultrasound product line.
- Managed team of eight engineers to design, test and manufacture all electronics needed for introduction of Silicon Ultrasound transducers.
- Technology evangelist presenting weekly to customers at Siemens' Innovation Center.

SENSANT CORPORATION

Manager, Research and Development, San Leandro, CA: 2003-2005

- Managed group which created electronics for first 2D and 3D images using silicon ultrasound transducer.
- Co-authored successful grant proposal to DARPA on battlefield ultrasound imaging and surgery. $7.5 M was awarded to Sensant and its collaborator.

Senior Staff Engineer, San Leandro, CA: 2000-2003

- Design of new types of imaging systems using capacitive micro-fabricated ultrasound transducers (cMUTs, also known as Silicon Ultrasound.)
- Co-authored several successful SBIR grant proposals.

GENERAL ELECTRIC COMPANY

Physicist, Corporate R&D, Niskayuna, NY: 1990-2000

- Designed algorithms for IC implementation; resulting beamforming IC was the heart of GE's successful entry into the premium ultrasound market.
- Developed statistical methods (now patented) for robust simultaneous design of transducer and imaging system to six-sigma quality standards.
- Much transducer design, acoustic field simulation and measurement.
- Research in signal processing for improved image quality and blood flow estimation. Several of these signal processing innovations are used in current GE products.

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Assistant Professor of Electrical and Computer Engineering, Urbana, IL: 1987-1990

- Research in scanning laser acoustic microscopy to characterize tissue, and applications of neural networks to ultrasonic imaging.
- Taught undergraduate courses in circuit theory, medical imaging, and acoustics.

- Thesis Advisor for Masters' students and undergraduate senior projects.

TESTIMONY EXPERIENCE

1. Hologic v. Fujifilm*, Certain X-ray Breast Imaging Devices and Components Thereof*, ITC Investigation No. 337-TA-1063. **Deposition**: Feb. 8, 2018; **Trial testimony**: Apr. 11, 2018.
2. Fujifilm v. Hologic, Patent Trial and Appeal Board, Case IPR2018-00595, patent number 7,688,940. **Deposition**: Nov. 27, 2018.
3. Superior Court of California, County of Santa Clara, Case 17CV311668, Lobo v. Intel Mobile. **Deposition**: Sep. 19, 2019; **Trial testimony** Feb. 26-27, 2020.
4. Philips North America v. Garmin International, Fitbit and others, *Certain Wearable Monitoring Devices, Systems and Components Thereof*, ITC Investigation No. 337-TA-1190. **Deposition**: Aug. 14, 2020; **Trial testimony**: Oct. 23, 2020.
5. BTL Industries v. Allergan USA, Zeltiq Aesthetics and others, *Certain Non-Invasive Aesthetic Body Contouring Devices, Components Thereof, and Methods of Using the Same*, ITC Investigation No. 337-TA-1219. **Deposition**: March 24, 2021; **Trial testimony**: June 18, 2021.
6. US District Court, Central District of California, Southern Division, Case 8:18-cv-2001, Masimo and Cercacor v. True Wearables and Lamego. **Deposition**: August 4, 2021; **Trial testimony**: March 18-22, 2022.
7. US District Court, Northern District of Illinois, Eastern Division, Case 1:19-cv-01374, Howe v. Speedway. **Deposition**: Sept. 24, 2021.
8. ReCor Medical and Otsuka Medical Devices v. Medtronic Ireland Manufacturing, Patent Trial and Appeal Board, Case IPR2022-00431, patent number 8,845,629. **Initial deposition**: Sept. 30, 2022; **Rebuttal deposition**: Mar. 2, 2023.
9. US District Court, Western District of Texas, Waco Division, Case 6:21-cv-00166-ADA, CPC Patent Technologies v. HMD Global Oy, **Invalidity deposition**: Jan. 9, 2023; **Noninfringement deposition**: Feb. 9, 2023.
10. US District Court, Northern District of California, Oakland Division, Case 4:19-cv-04162-YGR, Carl Zeiss Meditec v. Topcon Medical Systems et al., **Deposition**: May 4, 2023.
11. Butterfly Network v. FUJIFILM Sonosite, Patent Trial and Appeal Board, Case IPR2022-01575, patent number 7,867,168. **Deposition**: Aug. 2, 2023.
12. US District Court, District of Maine, Case 1:23-cv-00032, BTL Industries v. Rejuva Fresh and Jacobs. **Claim Construction Deposition**: Mar. 26, 2024.
13. Jumio v. Facetec, Patent Trial and Appeal Board, Cases IPR2025-00106; IPR2025-00107; IPR2025-00108; IPR2025-00109, patent numbers 10,776,471; 11,157,606; 11,693,938; 11,874,910. **Deposition**: Aug. 29, 2025.
14. US District Court, Southern District of Illinois, Case 3:20-cv-00264, Johns and Barron v. Paycor. **Deposition**: Jan. 7, 2026.
15. US District Court, Eastern District of Texas, Omni Medsci. v. Samsung Electronics and others. Case 1:24-cv-01070-JRG-RSP. **Depositions**: May 6 and 7, 2026.

16. Unaliwear v. Apple and others*, Certain Wearable Electronic Devices with Fall Detection and Components Thereof*, ITC Investigation No. 337-TA-1477. I**nfringement Depositions**: July 14 and 15, 2026; **Validity Deposition**: July 27, 2026.