Ken Gall

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Summary
Professor Gall is currently the Associate Dean of Entrepreneurship and Professor of Mechanical Engineering and Materials Science at Duke University. His expertise is in the mechanical behavior of materials with emphasis on the creation, modification, understanding, and commercialization of synthetic biomaterials. His publications have been cited over 21,000 times with an H-index of 77. He is a founder and director of six active medical device start-ups (Restor3d, Lacuna, Pressio, Huxley, DeepBlue, and Penderia). He is also a Director in four other early stage medical device companies (InnAVasc, Sparta, Kinos, and Orthobond). He was a founder and board member of two medical device startups, MedShape and Vertera, that have been acquired by public strategics for a total of $215M on $18M in combined annual run rate sales. MedShape was acquired through two different exits, the sports medicine division was acquired by Conmed (NASDAQ:CNMD) and the foot and ankle division was acquired by Colfax-DJO (NASDAQ:CFX). Vertera was acquired by Nuvasive (NASDAQ:NUVA).

Education

PhD	1998	Mechanical Engineering	University of Illinois at Urbana Champaign
MS	1996	Mechanical Engineering	University of Illinois at Urbana Champaign
BS	1995	Mechanical Engineering	University of Illinois at Urbana Champaign

Academic Appointments

2019-Current	Associate Dean	Entrepreneurship, Duke University
2016-Current	Professor	Orthopaedic Surgery, Duke University
2015-Current	Associate Director	MEDx, Duke University
2015-Current	Professor	MEMS Department, Duke University
2015-2019	Chair	MEMS Department, Duke University
2007-2015	Professor	Georgia Institute of Technology
2005-2007	Associate Professor	Georgia Institute of Technology
2003-2005	Associate Professor	University of Colorado at Boulder
1999-2003	Assistant Professor	University of Colorado at Boulder
1998-1999	Post-Doc	Sandia National Laboratories
1995-1998	Research Assistant	University of Illinois at Urbana-Champaign

Academic Leadership

MEMS, Department Chair

As department chair Professor Gall grew the MEMS department from 27 to 40 faculty in a four-year period. This includes key senior hires of Professor Cate Brinson, Professor Michael Rubinstein, Professor Shyni Varghese, Professor Christine Payne, and Professor Tony Huang. Professor Gall also built the MEMS department from a near neutral budget to one generating approximately $1M a year due to substantial growth in student and research programs. Professor Gall works closely with faculty to encourage and reward startup companies, with four new companies coming out of MEMS during his time as chair. During his tenure as chair, the number of PhD student applicants has doubled from 144 students in 2014 to over 300 students in 2017, a number that was held at about 150 for a decade. Finally, he is working with the

provost's office on a new science and technology initiative that will bring further growth in the areas of computing, robotics, and materials to the department.

MEDx, Associate Director
In collaboration with the Duke School of Medicine (SOM) Professor Gall co-directs the MEDx program with a professor in the SOM. MEDx is a campus wide initiative aimed at uniting the medical school and engineering school. We have built multiple programs within the MEDx framework including a seed grant program that has funded a dozen new collaborations between engineering and SOM, a vibrant competition to link surgeons and physicians to senior design teams in engineering, and a new program in engineering pulmonology funded by a Duke alumni donor. MEDx also serves an important role as a match maker between the over 1,000 faculty in the SOM and 120 faculty in the Pratt School of Engineering.

Start-Up Companies
MedShape Founder, BOD Member
Founded in 2005, Professor Gall has maintained an active leadership role in the company for over a decade across both business and technology fronts. He co-led a multi-year capital raise of approximately $45M in private, non-institutional equity investment. This investment allowed MedShape to successfully clear seven orthopedic implant systems containing advanced materials through the FDA, including multiple "firsts": a new polymer chemistry, a shape memory PEEK, and an implant comprised of both Ti and NiTi. MedShape's products are based on shape memory polymers for soft tissue reconstruction (Eclipse, ExoShape, Morphix), 3D printed Titanium for bunion repair (FastForward), and shape memory alloys for foot and ankle joint fusion (DynaNail, DynaClip, DynaNail mini). MedShape is a self-sustaining, growing company with annual revenue run rate of approximately $15M and two of its product lines have won industry-level (MDEA) device design excellence awards.
MedShape's Sports Medicine Business was acquired by ConMed in 2017
MedShape's FastForward system was acquired by a private company in 2018.

Vertera Founder, BOD Member
Founded in 2013, Professor Gall led a $6.0M private non-institutional capital raise and used this money to develop, clear, and launch a the first ever porous PEEK spinal fusion cage cleared through the FDA for both Cervical Fusion (Cohere) and Lumbar Fusion (Coalesce). The porous PEEK technology was supported in-part financially by the Duke Angel Network (DAN) .
Vertera was acquired by NuVasive in 2017.

DeepBlue Founder, BOD member
Founded in 2015, and funded by angel investors, DeepBlue is commercializing a novel hernia mesh that distributes stresses evenly across hernia repair sites for improved clinical outcomes.

restor3d Founder, BOD Member
Founded in 2017, and funded by angel investors at approximately $8M restor3d is commercializing 3D printed implants across a broad range of markets. Professor Gall led fundraising efforts and is currently leading the broad technology vision of the company as they prepare for market release. Restor3d currently has 2 FDA clearances and with an annual revenue run rate of approximately $2M.

Lacuna Founder, BOD Member
Founded in 2017, and funded by angel investors, Lacuna is developing a shape memory catheter that deploys itself into restricted spaces and prevents mechanical occlusion of the drainage ports. The launch product was submitted to the FDA for 510(k) clearance in late 2019.

Kinos *BOD Member*
Kinos is developing a new anatomic total ankle replacement. The launch product was submitted to the FDA for 510(k) clearance in late 2019.

InnAVasc *BOD member*
InnAVasc is commercializing a soft arteriovenous graft (AVG) modification that incorporates two multilayer cannulation chambers, with low bleed technology, that are resistant to posterior and sidewall needle penetration and injury. The launch product is currently in a overseas clinical study.

Federal and Industry Grants
Professor Gall has extensive fundraising experience through government agencies, in particular the National Science Foundation (NSF) and the National Institute of Health (NIH), and the commercial sector including numerous industrial grants. His grants include both basic research awards aimed at new fundamental science and Small Business Innovation in Research awards (SBIR) aimed at hastening technology commercialization. He has been a PI, Co-PI or consultant on 60 grants over the past fifteen years that have totaled $17M.

Awards
Professor Gall has received several dozen national and international research and teaching awards including the Presidential Early Career Award for Scientists and Engineers (PECASE), the TMS Robert Lansing Hardy Award, and the ASME Gold Medal, all given to top young scientists in their field. He also recently received the Curtis McGraw Award from ASEE given for excellence in publication for a scientist under 40 years of age. His teaching awards include the ASM Bradley Stoughton Award and numerous campus wide awards at both Georgia Tech (Senior Faculty Outstanding Undergraduate Research Mentor Award) and the University of Colorado (Sullivan-Carlson Innovation in Teaching Award) .

Graduate Students Advised

Katie Nelson	PhD, Current, Duke	3D printed CoCr and Titanium Materials
Emilio Bachtiar	PhD, Current, Duke	3D printed soft biodegradable and composite polymers
Will Koshut	PhD, 2021, Duke	Reinforcement and Durability of tough PVA hydrogels
Natalia Von Windheim	PhD, 2021, Duke	3D printed PEEK tissue scaffolds
Brian Allen	PhD, 2020, Duke	Antibiotic release from 3D printed scaffolds
Cambre Kelly	PhD, 2020, Duke	3D printed metal tissue scaffolds
Dalton Sycks	PhD, 2017, Duke	Development of Mechanically Robust 3D-Printable Photopolymers
Andy Miller	PhD, 2017, GaTech	Fatigue and cyclic loading of 3D printed soft polymers for orthopedic applications
Brennan Torstrick	PhD, 2017, GaTech	Effects of Surface Chemistry and Surface Topography on Poly-Ether-Ether-Keytone Osseointegration

Nathan Evans	PhD, 2016, GaTech	Processing-structure-property relationships of surface porous polymers for orthopedic applications
Reza Mirzaeifar	PhD, 2013, GaTech	A multiscale study of NiTi Shape Memory Alloys
Yuan Zhong	PhD, 2012, Gatech	Nanomechanics of plasticity in ultra-strength metals and shape memory alloys
Mary Pitz	MS, 2011, Gatech	Compression-Aided stability of Orthopedic Devices
David Safranski	PhD, 2010, Gatech	Poly(beta-amino esters) for cardiovascular applications
Kathryn Smith	PhD, 2010, Gatech	Tailoring the toughness and Biological Response of Photopolymerizable Networks for Orthopedic Applications
Bhaskar Pant	MS, 2010, Gatech	Experimental nanomechanics of 1D nanostructures
Alicia Ortega	PhD, 2010, Gatech	Structure-property relationships in photopolymerizable polymer networks.
Walter Voit	PhD, 2009, Gatech	Optimization of Mechanical Properties and Manufacturing Techniques to Enable Shape Memory Polymer Processing
Scott Kasprzak	PhD, 2009, Gatech	Small-Scale Polymer Structures Enabled by Thiol-Ene Copolymer Systems.
Matthew DiPrima	PhD, 2009, Gatech	Thermo-Mechanical and Micro-Structural Characterization of Shape memory Polymer Foams.
Heidi F. Khalil	MS, 2009, Gatech	Changes in the mechanical behavior of Nitinol following variations of heat treatment duration and temperature
Greg Vialle	MS, 2009, Gatech	Inductive Activation of Magnetite Filled Shape Memory Polymers
Brian Lin	MS, 2009, Gatech	Structure and Thermomechanical Behavior of NiTiPt Shape Memory Alloy Wires.
Edem Wornyo	PhD, 2008, Gatech	Nanomechanics of Shape Memory Polymers.
David Safranski	MS, 2008, Gatech	Effect of Chemical Structure and Crosslinking Density on the Thermo-Mechanical Properties and Toughness of (Meth)Acrylate Shape Memory Polymer Networks.
Terra Keim	MS, 2007, Gatech	Synthesis, Characterization, and Cyclic Stress-Influenced Degradation of a Poly(ethylene)glycol based Poly(beta-amino ester)

Austin Leach	PhD, 2007, Gatech	Atomistic Modeling of the Mechanical Behavior of Nanometer Scale Metals.
Chris Yakacki	PhD, 2007, Colorado	Shape-Memory Polymers for Biomedical Applications: An Investigation into Thermomechanics, Recovery Characteristics, and Cytocompatibility.
David Miller	PhD, 2007, Colorado	Galvanic Corrosion-Induced Damage of Miniaturized Silicon Structures.
Jeff Tyber	MS, 2005, Colorado	Mechanical Behavior of Materials for Reconstructive Bioengineering Applications.
Carl Frick	PhD, 2005, Colorado	Processing, Structure, and Property Relationships in NiTi Shape Memory Alloys at Multiple Length Scales.
Yiping Liu	PhD, 2004, Colorado	Thermomechancis of Shape Memory Polymers.
Jiankuai Diao	PhD, 2004, Colorado	Atomistic and Continuum Modeling of the Structure and Mechanical Properties of Metal Nanowires.
Alicia Ortega	MS, 2004, Colorado	Cast NiTi Shape Memory Alloys.
Neil West	MS, 2003, Colorado	Factors Affecting Creep in Gold on Polysilicon Bi-layer Cantilevered MEMS Beams.
Kevin Juntunen	MS, 2001, Colorado	Effects of Precipitate Size and Surface Normal Orientation on Micro-Indentation and Compressive Fatigue of NiTi Shape Memory Alloys.
Brian Corff	MS, 2000, Colorado	High Strain Rate Damage in Ductile Metals.

University Course Instruction

Duke University, 2015-Current

Students provide individual course evaluations online at the end of a course. The maximum score on a question is 5.0 (Strongly Agree) and the minimum is 1.0 (Strongly Disagree), and interpolated medial values are presented. The overall measure for teaching effectiveness is captured in the "Instructor Effectiveness" score.

Year	*Term*	*Course Title*	*Enrollment*	*Quality of Instructor*
2016	Spring	Structure and Properties of Solids	33	4.83
2018	Fall	Freshman Design Projects	45	
2019	Fall	Startup Fundamentals and Strategy	9	Current

Georgia Institute of Technology, 2005-2015

Students provide individual Course Instructor Opinion Surveys (CIOS) online at the end of a course. The maximum score on a question is 5.0 (Strongly Agree) and the minimum is 1.0 (Strongly Disagree), and interpolated medial values are presented. The overall measure for teaching effectiveness is captured in the "Instructor Effectiveness" score. The symbols U and G designate Undergraduate and Graduate courses, respectively.

Year	*Term*	*Course Title*	*Enrollment*	*Instructor Effectiveness*

2015	Spring	Mech Behavior of Materials (U/G)	59	5.0
2015	Spring	Materials Entrepreneurship (U/G)	17	4.8
2014	Fall	Engineering Materials (U)	99	4.8
2014	Spring	Materials Entrepreneurship (U/G)	42	4.8
2014	Spring	Engineering Materials (U)	106	4.9
2013	Fall	Engineering Materials (U)	106	4.8
2013	Spring	Engineering Materials (U)	100	4.8
2012	Fall	Engineering Materials (U)	97	4.8
2012	Spring	Engineering Materials (U)	97	4.9
2011	Fall	Engineering Materials (U)	95	4.9
2011	Spring	Engineering Materials (U)	85	4.9
2010	Fall	Engineering Materials (U)	96	4.9
2010	Spring	Mech Behavior of Materials (U/G)	57	4.9
2009	Fall	Engineering Materials (U)	99	5.0
2008	Spring	Engineering Materials (U)	100	4.8
2008	Spring	Engineering Materials (U)	101	4.9
2007	Spring	Engineering Materials (U)	112	4.8
2007	Spring	Engineering Materials (U)	117	4.9
2006	Spring	Engineering Materials (U)	88	4.9
2006	Spring	Nanomaterials (U)	14	4.5 (team taught)
2006	Spring	Nanomaterials (G)	12	4.3 (team taught)

University of Colorado, 1999-2005

Students provide individual course and instructor Faculty Course Questionnaire (FCQ) ratings anonymously. The cited "Course" and "Instructor" *overall* ratings are computed from the average of individual student rankings from a range of 0.0 (very poor) to 4.0 (very good). The symbols U and G designates Undergraduate and Graduate courses, respectively, and # is the number of students enrolled in the course.

Y ear	*Term*	*Course Title*	*#*	*Instructor*	*Course*
2004	Fall	Failure of Materials (U/G)	120	3.96 (A+)	3.85 (A)
2004	Spring	Material Science (U)	174	3.96(A+)	3.89 (A+)
2003	Fall	Failure of Materials (U/G)	93	3.95 (A+)	3.84 (A)
2003	Spring	Freshman Projects (U)	32	3.85 (A)	3.85 (A)
2002	Fall	Failure of Materials (U/G)	77	3.97 (A+)	3.87 (A)
2002	Spring	Freshman Projects (U)	33	3.88 (A+)	3.85 (A)
2001	Fall	Failure of Materials (U/G)	60	3.90 (A+)	3.83 (A)
2001	Fall	Materials Science I (G)	19	3.78 (A)	3.67 (A)
2001	Spring	Freshman Projects (U)	19	3.93 (A+)	4.00 (A+)
2000	Fall	Failure of Materials (U/G)	33	4.00 (A+)	3.96 (A+)
2000	Spring	Freshman Projects (U)	30	3.96 (A+)	3.75 (A)
1999	Fall	Materials Science I (G)	19	3.89 (A+)	3.67 (A)

Publications and Patents Via Google Scholar

Attached