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Richard C. Benson is dean of the College of Engineering at Virginia Tech (2005-present). This is his twenty-sixth year of academic administration. Previously, at Penn State, he served as head of the Department of Mechanical and Nuclear Engineering (1998-05) and head of the Department of Mechanical Engineering (1995-98). At the University of Rochester he served as chair of the Department of Mechanical Engineering (1992-95) and associate dean for graduate studies in the College of Engineering and Applied Science (1989-92). Prior to beginning his university career, he spent three years with the Xerox Corporation as a technical specialist and project manager (1977-80).

Benson's research at the University of Rochester was primarily focused on the mechanics of highly flexible structures. With sponsorship from the Eastman Kodak Company, Hewlett Packard, Bausch and Lomb, Xerox and others, he and his advisees modeled magnetic disks and tapes, paper sheets, soft contact lenses, photographic film and other easily deformed structures. Benson has received three significant honors from the American Society of Mechanical Engineers (ASME). In 1984 he received the ASME Henry Hess Award, which honors a research publication by a young author. In 1998 he was made a Fellow of the ASME. In 2009 he was elected to a three-year term on the ASME Board of Governors (2010-13).

Benson's teaching interests are in the fields of structural mechanics, design and applied mathematics. At the graduate level he has taught courses in structural mechanics, structural stability, plates and shells, elasticity and continuum mechanics. At the undergraduate level he has taught courses in advanced mechanical design, statics, mechanical systems, kinematics, complex variables and boundary value problems. In 1981 he was honored as the top teacher in the College of Engineering and Applied Science at the University of Rochester. At Penn State he co-taught, with a partner from the Women in Engineering Program, first-year seminars on toy making and dancing robots.

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Employment and Education Summary

- 8/05 – **VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY**, Blacksburg, VA 24061
Dean of the College Engineering.
Management of a college with approximately 330 faculty members, 220 staff members, 2,045 graduate students and 7,420 undergraduate students.
- 8/05 – **Professor of Mechanical Engineering, Professor of Engineering Science and Mechanics.**
- 7/98 – 6/05 **PENN STATE UNIVERSITY**, University Park, PA 16802-1412
Head of the Department of Mechanical and Nuclear Engineering.
Management of a department with approximately 51 faculty members, 27 staff members, 230 graduate students and 750 undergraduate students.
- 7/95 – 6/98 **Head of the Department of Mechanical Engineering.**
Management of a department with approximately 43 faculty members, 22 staff members, 200 graduate students and 650 undergraduate students.
- 7/95 – 8/05 **Professor of Mechanical Engineering.**
- 7/92 – 6/95 **UNIVERSITY OF ROCHESTER**, Rochester, NY 14627
Chair of the Department of Mechanical Engineering.
Management of a department with approximately 16 faculty members, 5 staff members, 75 graduate students and 170 undergraduate students.
- 7/89 – 6/92 **Associate Dean for Graduate Studies, College of Engineering and Applied Science.**
Oversight of student admissions, financial aid and progress towards degrees.
Supervision of part-time studies programs and assistance with research sponsors.
- 9/80 – 6/95 **Assistant (9/80), Associate (5/83), Full (3/89) Professor of Mechanical Engineering.**
- 7/86 – 7/87 **UNIVERSITY OF CALIFORNIA**, San Diego, CA 92093
Sabbatical Visitor at the Center for Magnetic Recording Research.
Research on the dynamics of a recording head impacting on a magnetic hard disk.
- 12/77 – 8/80 **XEROX CORPORATION**, Rochester, NY 14644
Technical Specialist/Project Manager.
Specialist in the mechanical behavior of paper and paper transport devices.
- 9/81 **PROFESSIONAL ENGINEER**, New York State, License Number 58617
Consultant specializing in the mechanics of flexible structures and the design of office machinery.
- 9/74 – 12/77 **UNIVERSITY OF CALIFORNIA**, Berkeley, CA 94720,
Ph.D. in Mechanical Engineering. Holder of IBM Fellowship.
- 9/73 – 8/74 **UNIVERSITY OF VIRGINIA**, Charlottesville, VA 22903,
M.S. in Mechanical Engineering. Holder of Thornton Fellowship.
- 9/69 – 6/73 **PRINCETON UNIVERSITY**, Princeton, NJ 08540,
B.S.E. in Aerospace and Mechanical Science. Graduated with honors.

Dean College of Engineering Virginia Tech

2005 – **Management of a college** with approximately 330 faculty members, 220 staff members, 2,045 graduate students and 7,420 undergraduate students.

Strategic Plan, 2006-2012. A six-year strategic plan was prepared for the College of Engineering in 05/06 that (among other things) called for the large and distinguished undergraduate programs to remain that way, to greatly increase graduate enrollment and research, to grow the college's presence in the National Capital Region of Northern Virginia, to expand international partnerships, to expand the college's infrastructure, to improve the quality of instructional spaces, and to increase the diversity of the college. Significant gains were made in each of these areas. (See below.)

Strategic Plan 2012-2018. A six-year plan was prepared for the College of Engineering in 11/12 that focused on five themes:

- (1) Provide a high quality environment for teaching, learning and research;
- (2) Recruit, educate and graduate a high quality and diverse undergraduate student body;
- (3) Recruit, educate and graduate a high quality and diverse graduate student body;
- (4) Address problems of regional, national and global importance; and
- (5) Support a diverse community of faculty, staff and students.

Faculty Hiring. From 05/06 through 13/14 the college hired 178 new engineering faculty members. The size of the faculty grew from 312 to 330. Of the new hires, 34 were women and 12 were from under-represented minority groups.

Administrator Hiring. From 05/06 through 13/14 the college hired 16 administrators: the associate dean for administration; the director of development; the associate dean for research and graduate studies (twice); the director of the Institute for Critical Technology and Applied Science; the director of the School of Construction; and the department heads for Aerospace and Ocean Engineering (twice), Biomedical Engineering and Mechanics, Chemical Engineering, Civil and Environmental Engineering, Computer Science, Electrical and Computer Engineering (twice), Mechanical Engineering, and Mining and Minerals Engineering.

Administrator Diversity. The head of Computer Science is the first woman to lead a department in the College of Engineering in the history of Virginia Tech. The head of Engineering Education is the second woman and first African-American to lead a department in the college. Two of the college's four associate deans are African-American women. (Both were appointed before Richard Benson became dean.)

Faculty Honors. From calendar year 2006 through 2014, 44 NSF CAREER Awards were received by College of Engineering faculty members. Twenty more individuals were hired by the college who had received CAREER Awards elsewhere. Four individuals received PECASE Awards, and five others were hired who had received PECASE Awards elsewhere. In addition, three engineering faculty members were honored with the Franklin Medal, one received a MacArthur "Genius" Grant, and four were elected to the National Academy of Engineering.

Dean
College of Engineering
Virginia Tech
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Research. Research expenditures in the College of Engineering grew from \$71M in 04/05 to \$161M in 13/14. In the same period, research spending per faculty member increased from \$229,500 to \$507,900. The college moved up three places, from 13th to 10th in the National Science Foundation ranking of total research expenditures by engineering colleges.

Fundraising. Eight of the nine best years for college fundraising occurred between academic year 05/06 and academic year 12/14 when an average of \$17.1M was annually raised. The average was \$9.1M for the preceding nine years. In 2005 the target for the College of Engineering in Virginia Tech's capital campaign was \$117M. That target was later raised to \$155M and the college finished the campaign in fall 2011 with \$205M raised.

Engineering Fee. In 2007 the college secured a new fee of \$30 per credit hour charged to students taking courses taught in the College of Engineering. The engineering fee, which has since been increased to \$36 per credit hour, produces close to \$5M annually to the college and is used in support of instructional labs and graduate teaching fellows.

Accreditation. The college had thirteen B.S. programs reviewed by the Accreditation Board for Engineering and Technology (ABET) in fall 2008. All were successful. A new undergraduate program in construction engineering and management received ABET accreditation in 2010. All fourteen programs were again successful in the fall 2013 ABET review.

Increasing Demand for Undergraduate Admission. 4,800 prospective students applied for admission to the College of Engineering for fall 2005. 8,480 prospective students applied for fall 2014, a 77% increase. Starting with fall 2010, the target size for the freshman engineering class was raised from 1200 to 1300, and then for fall 2013 the target size was raised from 1300 to 1400. Another major increase is planned for fall 2015 when 1650 first-year engineers will enroll.

Undergraduate Diversity.

The entering class of 2005 was 15.6% female, 2.1% African-American and 1.8% Hispanic. The entering class of 2014 is 25.5% female, 2.2% African-American and 5.5% Hispanic. Credit for these gains is due to the Center for the Enhancement of Engineering Diversity, led by the associate dean for academic affairs.

Teaching with Technology. In 2006, under the leadership of the associate dean for international programs and information technology, the College of Engineering began requiring all of its entering undergraduate students to have a tablet-PC. This has greatly enhanced the modes of communication among students and faculty, and opened new opportunities for active learning. This initiative was recognized with a Laureate Medal at the 2007 Computerworld Honors Program.

Graduate Enrollment Growth. In fall 2005 the college's graduate enrollment was 1,728. By fall 2014 the graduate enrollment had increased 27% to 2,057. The college's production of new doctoral graduates has been over 200 for each of the last two years. It is the first time in our history that the college has been in the national top-ten in the production of Ph.D.'s.

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Graduate Diversity. Led by the associate dean for research and graduate studies, the college's graduate classes have become substantially more diverse. Twenty-two students from underrepresented minority groups enrolled in fall 2014. Before the efforts of the current associate dean the numbers were typically in the single digits. The College also seeing greatly increased interest from organizations like the GEM National Consortium, which promotes graduate degrees for underrepresented students in engineering and science. As of January 2015, the college has 57 applications from GEM Scholars for fall 2015 admission. In 13/14, a quarter of the college's M.S. degrees and a fifth of its Ph.D. degrees were awarded to women. This is close to national averages.

Nuclear Engineering Graduate Degrees. M.S. and Ph.D. degree programs in nuclear engineering were reestablished at Virginia Tech on January 1, 2014. (They previously existed from 1960 to 1985.) Approval was received from the Virginia Tech Board of Visitors in November 2011, and from the State Council of Higher Education for Virginia (SCHEV) in July 2013.

Engineering Education Doctoral Degree. The Department of Engineering Education is a trail-blazing department founded in 2004 (shortly before Benson became dean) and one of only four such programs in the U.S. In 2008, the department began awarding a Ph.D. in engineering education.

Online and Distance Graduate Degree Programs. The college's online and distance graduate degree programs are highly regarded. The Masters of Information Technology program, which is jointly offered by the College of Engineering and the Pamplin College of Business, holds a number-two national ranking in the view of *U.S. News and World Report*. Overall, the College of Engineering has a number-fifteen ranking for its online graduate programs. Along with George Mason University, Old Dominion University, the University of Virginia and Virginia Commonwealth University, Virginia Tech has, since 1983, participated in the Commonwealth Graduate Engineering Program (CGEP) which a distance is learning program leading to master's degrees in selected engineering disciplines.

Departmental Merger. In spring 2014, the dean of engineering called for the merger of two departments, the Department of Engineering Science and Mechanics (ESM), and the Department of Biomedical Engineering (BME). Led by an ad hoc transition committee, the merger was completed by fall 2014 forming the Department of Biomedical Engineering and Mechanics (BEAM). The merger did not affect any course or degree offering by either the ESM or BME program faculty, but it is expected that the merger will hasten the approval of a new undergraduate major in biomedical engineering. The college already offers M.S. and Ph.D. degrees in biomedical engineering in a joint program with Wake Forest University. (See SBES description on page 7.)

International Programs. In 2007, oversight for the college's international programs was assigned to the associate dean for distance learning and computing (whose title has since become the associate dean for global engagement and chief technology officer.) The goals were to better coordinate heretofore ad hoc efforts, expand the opportunities for Virginia Tech engineering students and faculty members to work with scholars in other countries, and to insure that the college was taking an active role in the university's efforts to expand international programs. One of the most notable of these university initiatives is the VT-India ICTAS Innovation Center, which was launched in May 2014 near Chennai, India. (See ICTAS description on page 7.)

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Trips Abroad. Visits have been made by the dean of engineering to the following Virginia Tech international facilities and/or partner institutions:

- (1) The Center for European Studies and Architecture (Switzerland, 2005, 2006),
- (2) The Technical University of Darmstadt (Germany 2006),
- (3) The Indian Institute of Technology, Madras, and the Indian Institute of Science, Bangalore (India 2007),
- (4) The Virginia Tech - Middle East, North Africa facilities at Alexandria University and at the University of Cairo (Egypt, 2010),
- (5) Tianjin University and Shandong University (China, 2011),
- (6) Austral University (Chile, 2012),
- (7) Nottingham University (England 2012), and
- (8) The VT-India ICTAS Innovation Center, and the Indian Institute of Technology, Madras, (India 2014).

Virginia Tech Research Center - Arlington. The College of Engineering is leasing about 19,000 gross square feet at the Virginia Tech Research Center in Arlington, Virginia. The VTRC-A opened in June 2011. A partner research institute, the Institute for Critical Technology and Applied Science (ICTAS), is leasing an additional 7,000 gross square feet. The purpose is to increase the college's presence in the National Capital Region, strengthen ties to the industries in the region, be better equipped to respond to federal funding opportunities, foster research that is inherently urban in nature, and be in a preferred location for international partnerships.

Goodwin Hall. The building, formerly known as the "Signature Engineering Building," opened in summer 2014. Goodwin Hall has a 297 seat auditorium, eight general purpose classrooms, and is the academic home of the Departments of Chemical Engineering, Engineering Education, and Mechanical Engineering. The building is 153,000 gross square feet in size and cost approximately \$100 million, half of which was paid by the Commonwealth of Virginia. A lead gift of \$25M is the largest single gift in Virginia Tech's history.

Physical Expansion of the College. Including new building construction described elsewhere (Goodwin Hall, VTRC-A, three ICTAS research buildings), the College of Engineering has acquired new space in eleven new buildings since 2006. This has taken the assignable space per faculty member from 1,725 square feet in 2006 to 2,168 square feet in 2014.

April 16, 2007. On this day an assault left two students dead in a Virginia Tech dormitory and 30 more dead in Norris Hall. Of the 32 casualties, eleven were engineering students and three were engineering faculty members. Norris Hall was also the home of the Engineering Dean's Office. The following days and months presented many challenges, including providing solace to the families of the killed and injured, counseling the many who were traumatized by the event, restoring the teaching and research missions following an unprecedented upheaval, reopening Norris Hall for use by the Department of Engineering Science and Mechanics, and relocating the Engineering Deans Office to new quarters in Torgersen Hall.

College and University Service Virginia Tech

- 2005 – **Institute for Critical Technology & Applied Science (ICTAS)**. Stakeholders Committee Chair. Helped secure state and private support for three new buildings, with a total space of about 175,000 gross square feet. ICTAS houses the Nanoscale Characterization and Fabrication Laboratory, one of the finest nanotechnology labs to be found on any college campus. In 05/06, led the search that brought a distinguished scholar, previously with Bell Labs and the University of Colorado, to serve as ICTAS director.
- 2005 – **School of Biomedical Engineering and Science (SBES)**, Governing Board Co-Chair. SBES is a novel partnership among the School of Medicine at Wake Forest University, the College of Engineering at Virginia Tech, and the Virginia/Maryland School of Veterinary Medicine. The graduate curriculum is shared among the three colleges at the two universities, one public and one private. Students receive a degree with the seals of both WFU and VT. SBES research expenditures at Virginia Tech have grown from \$1.9M in 04/05 to \$19.5M in 13/14.
- 2006 – 08 **Rolls-Royce Project**, Worked with partners at the University of Virginia and the Virginia Economic Development Partnership to develop two new research centers: the Commonwealth Center for Advanced Manufacturing, and the Commonwealth Center for Aerospace Propulsion Systems. This was critical to Rolls-Royce's decision to locate a major manufacturing center in Petersburg, Virginia. In 2008, Virginia Tech leadership on the Rolls-Royce Project was taken over by the associate dean for research and graduate studies in the College of Engineering.
- 2005 – **Virginia Tech Transportation Institute**, Stakeholders Committee Chair. VTTI is Virginia Tech's largest research institute, with over \$40M in annual research spending.
- 2005 – **Center for Power Electronic Systems**, Governing Board Chair. CPES is a \$4 million/year research center dedicated to improving electrical power processing and distribution. It was the first NSF Engineering Research Center in Virginia, 1998-2008. It includes 5 university and over 60 industrial partners.
- 2008 – **Fralin Life Science Institute**, Stakeholders Committee Member. FLSI promotes research, education and outreach in the life sciences.
- 2010 – **Institute for Creativity, Arts and Technology**, Stakeholders Committee Member. ICAT promotes transdisciplinary research and artistic output, scientific and commercial discovery, and educational innovation.
- 2012 – **Virginia Tech Applied Research Corporation**, Board of Directors. VT-ARC extends Virginia Tech's applied research and development engagement with government and private sector clients.
- 2005 – 10 **AdvanceVT**, Executive Committee Member. AdvanceVT was created to improve the working environment, especially for women, in science and engineering. It was as funded by NSF from 2003 to 2010.
- 2005 – **Virginia Tech Corporate Research Center**, Board of Directors. The CRC is home to over 125 companies engaged in high-tech research and development.
- 2005 – **Promotion and Tenure**. Chair (nonvoting) of the College of Engineering P&T Committee. Member (voting) of the University P&T Committee.
- 2005 – **Ex-Officio Committee Memberships**. University Council, Council of College Deans, Economic Development Leadership Committee, Engineering Faculty Organization, Commission on Equal Opportunity and Diversity (05-07), Commission on Research (07-10), Commission on Graduate Studies (07-10), Commission on Athletics (10-14), President's Inclusion and Diversity Executive Council (15-).

Department Head Mechanical and Nuclear Engineering Penn State University

1998 – 05 **Management of a department** with approximately 51 faculty members, 27 staff members, 240 graduate students and 750 undergraduate students.

Merger of two departments. Devoted considerable time in 1997 and 1998 to learn about the faculty, staff, students, degree programs and research of the Department of Nuclear Engineering and the Breazeale Nuclear Reactor. Worked with Nuclear Engineering leadership and three different transition committees to effectively join the two departments into one administrative unit, as directed by the dean of engineering. Helped shepherd in operational guidelines for the new department, believed to be the first such document in the College of Engineering.

Preparation of a three-year strategic plan in 2001. Special emphasis placed on:

- (1) Faculty hiring in micro/nanotechnology, biotechnology, information technology, and energy and the environment;
- (2) Greater departmental activity in communications and development;
- (3) Increased opportunities for staff training in new fields.

Preparation of a three-year strategic plan in 2004. Special emphasis placed on:

- (1) Faculty hiring in micro/nanotechnology, biotechnology, information technology, and energy and the environment;
- (2) Providing leadership for a new university-wide research initiative on energy;
- (3) Increased engagement with graduate students;
- (4) Curriculum improvement through continuing assessment and reform; and
- (5) Acquisition of active-learning, IT-intensive classrooms.

Led department during a time of recognition of excellent scholarship. In 1995 only one member of the combined faculties (Mechanical Engineering and Nuclear Engineering) held the rank of distinguished professor, and no one held an endowed chair or professorship. In 2005 there were four distinguished professors, one endowed chair and two endowed professorships. Research spending on grants and contracts was approximately \$500,000 per faculty member in 04/05. That was up from approximately \$250,000 per faculty member in 95/96.

Faculty hiring. Ten new faculty members were hired between 1998 and 2003. Of these, two were women and one was from an under-represented minority group.

Accreditation. The fall of 2002 was the department's first experience with the new "ABET 2000" guidelines. Both programs (Mechanical Engineering and Nuclear Engineering) received the maximum period of renewal.

Space expansion. Worked with MNE faculty to justify the acquisition of "backfill" space for the department following expansion of the College of Engineering into the new West Campus. In 1998, 9,831 square feet was acquired following the opening of the Leonhard Building and the Earth-Engineering Sciences Building. In 2004, 2,543 square feet was acquired following the opening of the Information Science and Technology Building.

**Department Head
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Communications and development. Enhanced through three initiatives:

- (1) Support of the Grand Destiny capital campaign, which, among other benefits, produced the department's first endowed chair and endowed professorship.
- (2) Reorganization of the MNE Business Office in 2002 to create a new position of Director of Departmental Operations. The director had greatly expanded responsibilities for benchmarking, strategic planning, alumni relations and communications.
- (3) Assignment of a major gift officer to the department in 2003. In his first year, the gift officer acquired over \$600,000 in new endowment pledges.

New ME and NE course offerings. Assisted the organizers of four new curricular programs:

- (1) First-year seminars, which were designed to give an early introduction to the major to new students. With Cheryl Knobloch of the Women in Engineering Program, co-taught two of the ME seminars: ME 101S, Toy Fundamentals; and ME 102S, Dancing Robots.
- (2) IDEALS courses, which were one credit mechanical engineering laboratories that Integrate Design, Engineering Analysis and Life Skills.
- (3) NE/ME concurrent major. Through the coordination of offerings in the two curricula, a student could acquire both the NE and ME Bachelor of Science degrees with one additional semester of work. This contributed to a 180% increase in the junior/senior nuclear engineering enrollment at Penn State, from 31 in 00/01 to 87 in 04/05. Nearly half were concurrent majors. In the same time period the national junior/senior enrollment in nuclear engineering rose about 50%.
- (4) NE graduate courses by distance learning. In 2002 the nuclear engineering program began offering its graduate courses through distance learning. Approximately 30 students from Westinghouse, the Bettis Atomic Power Laboratory and the Knolls Atomic Power Lab were enrolled. All distance education courses were blended with resident course offerings with approximately 18 distance students in each class.

Comprehensive curriculum reform.

A comprehensive review of the mechanical engineering curriculum, with the purpose of reform, was undertaken in 03/04 and 04/05. The results were to increase active-learning opportunities, add modern content, remove outdated or redundant content, and slightly reduce the total number of required credits from 137 to 131.

Department Head Mechanical Engineering Penn State University

1995 – 98 **Management of a department** with approximately 43 faculty members, 22 staff members, 200 graduate students and 650 undergraduates.

Preparation of a five-year strategic plan in 1996. Special emphasis placed on:

- (1) More “hands on” learning experiences for our undergraduates;
- (2) Greater activity by faculty and students at major conferences;
- (3) Development of a distinguished lecturer series;
- (4) Intensified recruiting efforts for top graduate student prospects; and
- (5) Increased opportunities for faculty and staff training in new fields.

Faculty hiring. Seven new faculty members were hired between 1995 and 1998. Of these, one was a woman.

Led department during a time of recognition of excellent teaching.

Between 1997 and 2004 mechanical engineering faculty members received seven university-wide teaching prizes (two Atherton, three Eisenhower, two Alumni Teaching Fellow).

Accreditation. In the fall of 1996 the department received the maximum period of renewal from the Accreditation Board for Engineering Technology (ABET).

Recruitment of excellent graduate students. Supported Graduate Program Office staff in the creation of a “blue chip” graduate recruiting effort. Approximately 40 of the best applicants were brought to campus in February to meet with faculty, current students and each other. The “blue chip” yield was approximately 65%, which was greater than the overall yield.

Enhancement of student learning workshops. Supported organizers of two workshops:

- (1) Student Learning Outside of the Classroom (August 1997): The goal was to explore ways in which faculty could adjust their instructional methods to help enhance student learning when not in class. Half a dozen “curricular experiments” were conducted in the following semester and then reviewed at the January 1998 workshop.
- (2) Integration of Subject Matter Through the Curriculum (January 1998): The goal was to explore ways in which our teaching could be made more effective by becoming better aware of what our colleagues expect of their students at different stages in the curriculum.

Hands-on laboratories for undergraduates. Supported developers of labs designed to increase the hands-on experiences of our students:

- (1) The Learning Factory: a 3,500 sq. ft. machine shop and design studio used in capstone design projects, first-year seminars and extracurricular projects like the SAE Formula Car.
- (2) Texaco Energy Systems Lab: a lab used to augment “theory” courses. The lab had a refrigerator, IC engine, a steam engine, small gas turbine, mini-wind tunnel, two dynamometers and a vibration test stand. Computer simulations accompanied each test-stand.
- (3) Ingersoll-Rand Noise Control Lab: students studied noise reduction using instrumentation and small machines donated by Ingersoll-Rand.

College and University Service Penn State University

- 2001 – 05 **Materials Research Institute Advisory Board**, Member. Monthly reviews of an interdisciplinary institute involving 200 faculty members from 15 different departments.
- 2000 – 01 **Penn State Leadership Academy**, Co-organizer of a program to orient new department heads at Penn State. Responsible for the final “capstone” workshop.
- 1999 – 03 **Teaching and Learning Consortium**, Member of a team of about a dozen department heads led by the former provost seeking ways to improve teaching and learning at Penn State.
- 1999 – 04 **Penn State Nuclear Reactor Safeguards Committee**, Member. Quarterly reviews of the Breazeale Nuclear Reactor on the Penn State campus.
- 1998 – 02 **Applied Research Lab Advisory Board**, Member. Biannual review of a 700-employee laboratory that is affiliated with Penn State and primarily focused on Navy research.
- 1998 – 00 **Kellogg Leadership for Institutional Change**, Participant in a program sponsored by the Kellogg Foundation to promote leadership development at Land Grant universities.
- 1998 – 00 **Penn State Leader**, Annual speaker for a program designed to help faculty and staff develop leadership skills.
- 1998 – 99 **Information, Communication and Computational Technology Committee**, Member. A COE planning committee to identify research opportunities in the named areas.
- 1997 – 98 **Taskforce on Faculty Release Time, Cost Sharing and Overhead Return**, Chair. A COE study of administrative strategies in the named areas.
- 1997 – 00 **Steering Committee for the Academic Leadership Forum**, Member. Helped set workshop agenda (about 4 a year) for deans, department heads and administrators.
- 1997 – 04 **Fifth Year Reviews**, Member of the following “AD-14” committees for PSU administrators: Dean of Engineering (03-04); COE Associate Dean for Administration and Planning (02-03), committee chair); Director of the Applied Research Lab (97-98).
- 1996 – 04 **College of Engineering Head/Director Search Committees**. Member of the following search committees: Engineering Leadership Development Program (04-05); School of Engineering Design, Technology and Professional Programs (02-04); Department of Industrial and Manufacturing Engineering (00-01); Department of Chemical Engineering (99-00); Department of Electrical Engineering (98-99); Acoustics Program (96-97).
- 1996 – 97 **Undergraduate Academic Program Assessment Committee**, Member. A university-wide committee to study measures of success in undergraduate programs.
- 1995 – 05 **Review Board for the Pennsylvania Transportation Institute**, Member/Chair. The PTI is an interdisciplinary center promoting transportation engineering research and education. Chaired the review board from 1998 to 2000.
- 1995 – 05 **Big-Ten-Plus Mechanical Engineering Department Heads**. Met annually with the other mechanical engineering department heads in the Big-Ten to share benchmarking information. In 1999 this group expanded to become the Big-Ten-Plus, which includes California-Berkeley, Carnegie Mellon, Cornell, Georgia Tech, MIT, Stanford and Texas.
- 1995 – 05 **College of Engineering Executive Committee**, Member. Representing the Department of Mechanical Engineering (95-98) and then the Department Mechanical and Nuclear Engineering (98-05).

Department Chair Mechanical Engineering University of Rochester

1992 – 95 **Management of a department** with approximately 16 faculty members, 5 staff members, 75 graduate students and 170 undergraduate students.

Led the department during a time of strong growth in undergraduate credit hours.

At a time when mechanical engineering enrollments were declining at many private universities in the northeast, our program experienced a 30% increase in undergraduate credit hours between 91/92 and 94/95. This was achieved by:

- (1) Teaching sophomore level mathematics to ME and physics majors;
- (2) Offering introductory courses in statics and dynamics every semester;
- (3) Offering key courses in the summer; and
- (4) Creating a minor in mechanical engineering.

Created an Internship with Industry Program for our undergraduates.

This program was designed to take advantage of the university's location in the city of Rochester, New York. Students worked about 10 hours a week during the academic year and full time in the summer. Interns were placed at Kodak, Bausch and Lomb, General Motors Delphi Division and Xerox.

Created a Departmental Assistantship for selected University of Rochester graduates continuing on in the department's master's program. These students had 75% of their tuition waived in return for about 8 hours a week of service to the department – mostly as teaching assistants. Four students took advantage of the DA in its first year (93/94) and seven in its second year (94/95). This dovetailed nicely with the new undergraduate minor in mechanical engineering (see above), as several physics majors with ME minors continued on for a master's degree in ME.

Led the department during a time of strong growth in research activity.

Between 91/92 and 94/95:

- (1) Faculty salaries charged to external grants and contracts increased 118%, from \$94,000 to \$205,000;
- (2) Graduate student tuition revenue increased 80%, from \$123,000 to \$222,000;
- (3) Graduate student stipends charged to external grants and contracts increased 29%, from \$320,000 to \$414,000; and
- (4) Graduate student stipends charged to the departmental budget decreased 13%, from \$123,000 to \$107,000.

Visiting committee reviews. Made annual presentations on the state of the department to the Board of Trustees Visiting Committee.

**Associate Dean for Graduate Studies
College of Engineering and Applied Science
University of Rochester**

1989 – 92 **Oversight of college graduate activities.**

Assisted the departments of the College of Engineering and Applied Science in the following tasks:

- (1) Admission to the university and the awarding of financial aid;
- (2) Monitoring of graduate student progress;
- (3) Awarding of degrees;
- (4) Supervision of part-time studies programs;
- (5) Resolution of advisor/advisee conflicts; and
- (6) Interactions with research sponsors.

Served four departments with five graduate degree programs.

- (1) Chemical Engineering;
- (2) Electrical Engineering;
- (3) Mechanical Engineering, with programs in mechanical engineering and materials science; and
- (4) Optics.

Programs implemented to reduce costs and increase graduation rates.

Studied teaching assistant needs across the College of Engineering and Applied Science, and based TA stipend allocations (from the college to the departments) on these needs. Simultaneously led successful efforts to increase admissions standards, reduce attrition, and reduce time-to-degree. Thus, despite the decrease in internal spending, graduation totals increased.

Support of part-time students.

Managed the “Special Opportunity Graduate Program” with Xerox and Kodak. SOGP students had between 8 and 16 hours per week release time for their studies. Gave orientations at local companies. Created a three-course certificate program for focused study at the graduate level.

Ex-officio committee assignments.

Represented the College of Engineering and Applied Science on three university committees: the Council on Graduate Studies; the Part-Time Studies Oversight Committee; and the Committee on Graduate Student Life

Visiting committee reviews.

Made annual presentations on the state of the graduate program in the College of Engineering and Applied Science to the Board of Trustees Visiting Committee.

College and University Service* University of Rochester

- 1994 – 95 **Task Group on Admissions and Financial Aid**, Member.
Committee of two made thorough study of admissions and financial aid policies, and made recommendations for change to the new University of Rochester President. These changes resulted in a more competitive tuition rate and a higher standard for admission.
- 1993 – 94 **Faculty Advisory Committee on the Presidential Search**, Member.
College of Engineering and Applied Science representative on the search committee that brought Thomas Jackson to the University of Rochester as President.
- 1992 – 93 **Committee on Administrative Restructuring**, Member.
Ad hoc committee to recommend new administrative structures for delivering non-curricular service to the students of both the College of Arts and Science and the College of Engineering and Applied Science.
- 1990 – 91 **Rochester College Task Force**, Member.
Ad hoc committee to implement new undergraduate programs and administrative structures at the University. The committee membership included the president, provost, deans of major colleges and other top administrators.
- 1989 – 90 **College of Arts and Science Commission on Enrollment**, Member.
College of Engineering and Applied Science representative to the College of Arts and Science commission studying enrollment trends and recruiting strategies.
- 1989 – 90 **Faculty Senate Committee on Merit Based Scholarships**, Chair.
Ad hoc committee to study desirability of scholarships based on academic merit.
- 1985 – 86 **Program for New Faculty**, Co-Director.
A program to help new faculty in their first years at the University of Rochester.
- 1985 – 86 **University Study Group on Student Affairs**, Member.
Ad hoc committee studied the state of student life, and recommended administrative restructuring that led to a newly defined post for the Dean of Students.
- 1984 – 86 **University Faculty Senate**, Member.
- 1981 – 83 **National Society of Black Engineers**, Faculty Advisor.
The NSBE student chapter at the University of Rochester was founded in 1981.

* Exclusive of Assignments as Associate Dean for Graduate Studies in the College of Engineering and Applied Science.

Department Service* **University of Rochester**

- 1988 – 89 **Graduate Committee, Chair.**
Execution of graduate program policy.
Supervision of the Ph.D. qualifier exam and M.S. comprehensive exam.
- 1987 – 88 **Undergraduate Committee, Chair.**
& 85 – 86 Execution of undergraduate program policy.
Coordinated plans for part-time undergraduate studies for Xerox employees.
- 1983 – 85 **Graduate Recruiter**
Negotiated a plan for part-time Ph.D. studies by engineers from local companies.
The plan including standards for nonproprietary research, patent rights and residency.
Created first department brochure for graduate student recruiting.
- 1983 – 84 **Mechanical Engineering Department Chair Search Committee, Member.**
- 1982 – 86 **Industry sponsorship of the advanced mechanical design class project**
Obtained industry sponsorship for the student projects in ME 205, Advanced Mechanical Design. Local companies supplied design requests. Students worked with engineers from the sponsoring companies. Worthy designs were built by the sponsors.
- 1981 – 86 **Faculty searches in solid mechanics, Chair.**
As part of the development of a new Solid Mechanics Group in the Department of Mechanical Engineering (see below), chaired the search committees that brought four additional faculty members to the Department of Mechanical Engineering. One of these four new-hires was the first woman hired for a tenure-track position in the history of the College of Engineering and Applied Science at the University of Rochester.
- 1980 – 86 **Solid Mechanics Group in the Department of Mechanical Engineering**
In 1979 the Mechanical Engineering Department committed to building a new strength in solid mechanics and design. As the first faculty member hired in the group, had major responsibility for its further development. This included the:
- (1) Creation of six new graduate courses;
 - (2) Acquisition of research funds;
 - (3) Creation of a weekly seminar series;
 - (4) Acquisition of new journal subscriptions for the Engineering Library; and
 - (5) Initiation of ties to government agencies, professional societies, and industrial groups with related interests.

* Prior to becoming chair of the department.

Service to Professional Organizations

MEMBERSHIPS

- 1985 - **American Society of Engineering Education (ASEE)**
1978 - **American Society of Mechanical Engineers (ASME)**

EDITORIAL POSITIONS

ASME Press

- 2002 – 06 Chair of the Advisory and Oversight Committee.
1990 – 10 Member of the Advisory and Oversight Committee.

ASME Journal of Applied Mechanics

- 1997 – 03 Associate Editor.
1986 – 87 Member of the Technical Editor Search Committee.

Applied Mechanics Reviews

- 2003 – 05 Chair of the Editorial Advisory Board.
1998 – 10 Member of the Editorial Advisory Board.
1986 Guest Editor for 1986 issue on “Applied Mechanics Problems in Industry.”
1985 – 97 Associate Editor.

AMERICAN SOCIETY OF ENGINEERING EDUCATION

Engineering Deans Council.

- 2005 – Member from Virginia Tech.
2008 – Member of the Public Policy Committee.
2013 – 15 Vice Chair of the Public Policy Committee

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

- 2014 – 15 **Executive Director Evaluation and Staff Compensation Committee**, member.
- 2010 – 13 **Board of Governors (BOG)**, Elected to a three-year term in 2009.
2012 – 13 Chair of the BOG Committee on Governance.
2010 – 13 Member of the BOG Committee on Governance.
- Risk Analysis and Management for Critical Asset Protection (RAMCAP)**
2007 – 08 Chair of Advisory Committee
2008 – 11 Member of the Standards Committee
RAMCAP is managed by ASME Innovative Technologies Institute, a wholly owned, not-for-profit subsidiary of ASME. The organization has developed a methodology to assess risks at colleges and universities in three areas: natural hazards, personal security, and building security.
- Mechanical Engineering Department Heads and Chairs Committee.**
2004 – 05 Chair of the 2005 Mechanical Engineering Education Conference
1997 – 99 Chair of an ad hoc sub-committee to explore financial trends at member institutions.
1992 – 05 Member from the University of Rochester (92-95) and then Penn State (95-05).
- 2003 – 04 **Body of Knowledge Task Force**, Member.
Tasked to “promote timely action on the modernization of mechanical engineering education.”

Service to Professional Organizations (CONTINUED)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (CONTINUED)

- 1990 – 92 **Information Storage and Processing Systems Sub-Division**
Organized sessions on flexible media for annual ISPS Symposium at the ASME Winter Annual Meeting. Served as the associate editor handling reviews for flexible media papers appearing in *Advances in Information Storage Systems*.
- 1987 – 95 **Rochester City Section**, Member of the Executive Committee.
- Applied Mechanics Division**
- 1986 – 90 Materials Processing and Manufacturing Committee, Member.
1983 – 86 Committee on Basic Engineering for Manufacturing, Member.
1983 – 85 Membership Development Committee, Chair.
1979 – 83 Executive, General, Publication and Program Committees, Recording secretary. (Four year cycle of appointments paralleling Bill Gottenberg's service as chair of the same committees.)

UNIVERSITY REVIEW COMMITTEES

- 2013 **Michigan Technical University**, College of Engineering
2012 **University of Maryland**, Department of Mechanical Engineering
2011 **Northeastern University**, College of Engineering
2011 **University of Colorado, Boulder**, College of Engineering
2010 **University of Maryland, Baltimore County**, Department of Mechanical Engineering
2008 **University of Michigan**, Department of Mechanical Engineering
2007 – 11 **Purdue University**, School of Engineering Education
2007 **Israel Institute of Technology (The Technion)**, Department of Mechanical Engineering
2007 **Georgia Tech**, Woodruff School of Mechanical Engineering
2007 – 10 **Cal Poly, San Luis Obispo**, College of Engineering.
2003 **Ohio State University**, Department of Mechanical Engineering.
1999 **University of Virginia**, Department of Mechanical, Aerospace and Nuclear Engineering.
1992 – 94 **Carnegie Mellon University**, Department of Mechanical Engineering

OTHER SERVICE

- 2012 – **U.S. Manufacturing Competitiveness Initiative**, Member of the Executive Advisory Committee. A nonpartisan, nongovernmental organization providing advice on American competitiveness.
- 2009 – **Atlantic Coast Engineering**, Cofounder of a benchmarking group of the deans of the nine colleges of engineering in the Atlantic Coast Conference: Clemson, Duke, Florida State, Georgia Tech, Maryland, Miami, North Carolina State, Virginia and Virginia Tech. Recently expanded to include Louisville, Notre Dame, Pittsburgh and Syracuse.
- 2005 – **Virginia Engineering Deans**, Annual meeting with the engineering deans in the Commonwealth of Virginia: George Mason, Hampton, Norfolk State, Old Dominion, Virginia, Virginia Commonwealth, Virginia Military, Virginia State and Virginia Tech. Meetings coincide with the ASEE Public Policy Colloquium. Visit with members of Virginia delegations in the House of Representatives and Senate to discuss matters of engineering importance in the Commonwealth and Nation. Other meetings are called on an ad hoc basis.

Service to Professional Organizations (CONTINUED)

OTHER SERVICE (CONTINUED)

- 2005 – **Virginia Microelectronics Consortium (VMEC)**
2005 – 12 Secretary/Treasurer of the Executive Committee.
2012 – 14 Chair of the Executive Committee
VMEC is a partnership among universities (George Mason, Old Dominion, Virginia, Virginia Commonwealth and Virginia Tech), industry, and state government aimed at making Virginia a national leader in microelectronics education and research.
- 2005 – **National Institute of Aerospace (NIA)**, Deans Committee Member.
The NIA is a consortium of six universities (Georgia Tech, Maryland, NC A&T, NC State, Virginia and Virginia Tech) partnering with NASA-Langley to offer graduate degrees and conduct research in aerospace engineering.
- 2005 – 12 **World Institute for Disaster Risk Management**, Member of the Board of Directors.
- 1994 – 97 **Pi Tau Sigma**, Member of the National Honors and Awards Committee.
- 1992 **National Science Foundation**, Member of the review team for the Dynamic Systems and Controls Program in the Division of Mechanics and Structural Systems.

Teaching and Research Record

TEACHING SUMMARY

- 1995 – 05 **Courses taught at Penn State:** ME 101S, Toy Fundamentals; ME 102S, Dancing Robots; ME 564, Structural Stability. (The first-year seminars were co-sponsored by the Women in Engineering Program and co-taught by Cheryl Knobloch.)
- 1979 – 95 **Undergraduate courses taught at the University of Rochester:** ME 120, Statics; ME 201 Boundary Value Problems; ME 202 Complex Variables; ME 203, Kinematics; ME 205, Advanced Mechanical Design; ME 213, Mechanical Systems. (Also taught complex variables in 1979 as a part-time lecturer while employed by Xerox.)
- 1980 – 95 **Graduate courses taught at the University of Rochester:** ME 440, Structural Mechanics; ME 444, Continuum Mechanics; ME 445, Plates and Shells; ME 448, Structural Stability; ME 449, Elasticity. (The courses on continuum mechanics, structural stability and elasticity were first taught at the University of Rochester by Benson.)

RESEARCH SUMMARY

Mechanics of Flexible Structures: The modern office is filled with printers, copiers, scanners, data storage devices and other machines that handle very flexible objects with speed and precision. Modeling the often nonlinear and transient behavior of flexible structures has been Richard Benson's principal research thrust. Most of the funding has come from industrial sponsors that have sought analysis tools tailored to their design needs and with capabilities beyond what is available in commercial computer packages. Benson's interest in flexible structures had its origin in the mid-1970s when he held an IBM Fellowship at the University of California, Berkeley and made one of the earliest studies of the mechanics of a "floppy" magnetic disk. From 1977 to 1980 Benson was employed by the Xerox Corporation in Rochester, New York where he conducted research on the mechanics of paper and the design of paper-handling machines. Benson moved to the University of Rochester in 1980 where he founded the Mechanics of Flexible Structures Project. On the next page is a listing of the students who conducted research on the mechanics of flexible structures. Due to increased administrative responsibility (largely dating from the 1995 move to Penn State) Benson's personal research activity is considerably less than what it had been at the University of Rochester.

HONORS

- 2009 **Elected to the Board of Governors of the American Society of Mechanical Engineers.**
- 2007 **Paul and Dorothea Torgersen Dean's Chair in Engineering,** Virginia Tech.
- 2004 **Distinguished Lecturer,** invited by the Virginia Tech Department of Mechanical Engineering to speak on "The Future of Mechanical Engineering Education."
- 1998 **Fellow of the American Society of Mechanical Engineers.**
- 1997 **Keynote Address** at the International Conference on Micromechatronics in Tokyo, Japan (#79 in presentation list).
- 1987 **Southwest Mechanics Lecture Series,** invited speaker (#30-33 in presentation list).
- 1984 **Tau Beta Pi,** inducted as an eminent engineer in the New York - Kappa chapter.
- 1984 **The Henry Hess Award,** given by the American Society of Mechanical Engineers to honor an outstanding research publication by a young author.
- 1982 **Lilly Foundation Teaching Fellow.**
- 1981 **Excellence in Teaching Award,** given to the top teacher in the college, as voted by the students in the College of Engineering and Applied Science at the University of Rochester.

Student Research Supervision

DOCTORAL STUDENTS AT THE UNIVERSITY OF ROCHESTER

- 1993 – 96 **John LaFleche**, “Deformation, Temperature and Mass Diffusion Modeling of Thin Films with Application to Digital Thermal Printing.” (Co-advisor with Prof. Stephen Burns.)
- 1991 – 96 **Ming Tian**, “Mechanics of Soft Contact Lens Design”
- 1991 – 95 **Ken Stack**, “A Nonlinear Finite Element Model of Axial Variation in Nip Mechanics with Application to Conical Rollers”
- 1992 – 95 **Ted Diehl**, “Two-Dimensional and Three-Dimensional Analysis of Nonlinear Nip Mechanics with Hyperelastic Material Formulations”
- 1990 – 94 **Sinan Müftü**, “The Transient Foil Bearing Problem in Magnetic Recording”
- 1989 – 93 **Han Chieh Chiu**, “Mechanical and Thermal Wrinkling of Polymer Membranes” (Co-advisor with Prof. Stephen Burns.)
- 1989 – 92 **Jim Stolte**, “An Extending, Dynamic Elastica: Analysis with Inertial Loads and Impact with a Surface”
- 1985 – 89 **Ramesh Sundaram**, “The Effect of Concentrated Loads on Flexible Tapes with Application to Magnetic Recording”
- 1984 – 88 **Alan Brewen**, “The Effect of Warpage, Tension Variation and Stiffness Variation on the Periodic Response of a Tape Passing Over a Recording Head”
- 1984 – 86 **Kevin Cole**, “The Effect of Imperfect Geometry on the Transverse Deflection of a Flexible Disk”
- 1982 – 86 **Amitabha Mukerjee**, “Self-Calibration Strategies for Robot Manipulators” (Co-advisor with Prof. Dana Ballard.)
- 1982 – 85 **David Crispino**, “The Stability of Twisted Orthotropic Plates”
- 1981 – 85 **Pierre Darmon**, “Large Inextensible Deformation of Thin Orthotropic Inhomogeneous Cantilevered Plates with Distributed Loads”
- 1980 – 82 **Ray Johnson**, “A Method of Optimal Design Extended to Systems of Mechanical Elements Having Interrelated Boundary Effects” (Note: Johnson was already an experienced practitioner of optimal design when this work was done.)

MASTERS STUDENTS (WITH THESIS) AT PENN STATE UNIVERSITY

- 1998 – 99 **Paul Menzel**, “Offset Defects During Duplex Fusing in Color Electrophotographic Systems”
- 1997 – 98 **Jennifer Fried**, “The Mechanics of Roll Winding in the Presence of a Rider Roller” (Co-advisor with Dr. Kenneth Stack.)
- 1996 – 97 **Stephen Lesniak**, “A Computer Simulation of a Cut Sheet of Paper Being Transported Over a Rigid Surface of Arbitrary Size and Shape” (Co-advisor with Dr. Kenneth Stack.)

MASTERS STUDENTS (WITH THESIS) AT THE UNIVERSITY OF ROCHESTER

- 1993 – 94 **Guy Olivé**, “A Study of Wound Rolls During Winding and Unwinding”
- 1991 – 93 **Suzzette Solano**, “Curl Due to Moisture and Temperature Changes in a Two-Channel Composite” (Co-advisor with Dr. Frank Zirilli.)
- 1989 – 91 **Ken Stack**, “A Study of Friction Feed Paper Separation”

PRIZE WINNING UNDERGRADUATE ADVISEES AT THE UNIVERSITY OF ROCHESTER

- 1989 & 93 **Ken Stack** and **Frank Duver** each won the Charles L. Newton Prize, which is given at Commencement at the University of Rochester to honor an independent research project by an engineering undergraduate. Ken Stack’s 88/89 project was on sheet transport through channels and was sponsored by the Eastman Kodak Company. Frank Duver’s 92/93 project was on nondestructive testing of soft contact lenses and was sponsored by Bausch and Lomb.

Research Funding

FUNDING AT PENN STATE UNIVERSITY

- 1995 – 99 **Eastman Kodak Company**, \$205,000. Mechanics of Flexible Structures. Combined support from Corporate Contributions and several Kodak Divisions. Interest in sheet transport through channels, tape transport, digital thermal imaging and air lubrication.
- 1996 – 98 **Eastman Kodak Company**, \$44,148. Kodak Fellowship for a graduate student studying tape-path trajectories and steering.
- 1996 – 98 **DuPont Corporation**, \$40,000. Polymer Film Winding in the Presence of a Rider Roller. Co-Investigator with Dr. Kenneth D. Stack (PI).
- 1996 – 97 **Bausch and Lomb**, \$51,164. Three-Dimensional On-Eye Contact Lens Modeling Using Nonlinear Finite Elements. Co-Investigator with Dr. Kenneth D. Stack (PI).
- 1996 & 97 **National Science Foundation**, Summer support for two undergraduate students in the Research Experience for Undergraduates (REU) Program. One of many project advisors assisting Prof. Laura Pauley (PI).
- 1996 – 97 **Gentex Corporation and Ben Franklin Partnership**, \$143,000. Improved Helmet Modeling Process. One of three co-investigators with Prof. Ashok Belegundu (PI).

FUNDING AT THE UNIVERSITY OF ROCHESTER

- 1989 – 97* **Eastman Kodak Company**, \$1,247,000. Mechanics of Flexible Structures. Combined support from Corporate Contributions and several Kodak Divisions. Interest in paper dynamics, web wrinkling, nip mechanics and digital thermal imaging.
- 1992 – 97* **Bausch and Lomb**, \$112,100. Mechanics of a Flexible Contact Lens. Fellowship support for a graduate student. Additional support through summer jobs, and two undergraduate internships.
- 1994 – 97* **Hewlett Packard**, \$192,284. A Tape/Guide System Model. Support in the form of a graduate student fellowship (\$126,382) plus equipment grant (\$67,902).
- 1994 – 95 **Summagraphics**, \$15,000. Mechanics of Flexible Webs Used in Digital Color Photography.
- 1994 – 95 **Technical Association of the Pulp and Paper Institute**, \$40,000. Air-Bar Stabilization of a High-Speed Web.
- 1991 – 92 **3M**, Tape Transport Along a Guide. Summer job for a graduate student. Collaborative studies at the University of Rochester by a “Leap Grant” visitor from 3M.
- 1983 – 88 **Eastman Kodak Company**, \$145,000. Magnetic Tape Transport Mechanics.
- 1987 – 88 **National Science Foundation**, \$297,232. Large Elastic Deformation of Moderately Thick Orthotropic Shells of Revolution. Co-Investigator with Prof. Larry Taber (PI).
- 1986 – 87 **Center for Magnetic Recording Research**, \$40,000. Sabbatical studies on head/disk impacts in magnetic recording.
- 1984 – 86 **National Science Foundation**, \$148,400. Large Deformation of Elastic Shells of Revolution. Co-Investigator with Prof. Larry Taber (PI).
- 1982 – 86 **Gleason Memorial Fund**, \$102,500. Doctoral Research in Machine Dynamics.
- 1982 – 85 **Xerox Corporation**, \$110,000. Inextensible Plate Theory Applied to the Large Deformation of Lightweight Machine Elements.
- 1981 – 82 **Center for Naval Analysis**, \$26,000. Stability of a Spinning Disk with a Transverse Load.

* Richard Benson maintained visiting professor status at the University of Rochester for two years after leaving for Penn State University in July 1995. The purpose was to continue supervising the doctoral students and research projects still in progress at UR. The Kodak, B&L and HP projects were eventually transferred to PSU.

Technical Publications

1. Benson, R.C., and Bogy, D.B., "Deflection of a Very Flexible Spinning Disk Due to a Stationary Transverse Load," *ASME Journal of Applied Mechanics*, Vol. 45, No. 3, Sept. 1978, pp. 636-642.
2. Benson, R.C., "The Deformation of a Thin, Incomplete, Elastic Ring in a Frictional Channel," *ASME Journal of Applied Mechanics*, Vol. 48, No. 4, Dec. 1981, pp. 895-891.
3. Benson, R.C., "Stick/Slip Conditions for a Thin, Incomplete, Elastic Ring Impinging on a Frictional Barrier," *ASME Journal of Applied Mechanics*, Vol. 49, No. 1, March 1982, pp. 231-232.
4. Benson, R.C., "The Steady-State Response of a Cantilevered Rotor with Skew and Mass Unbalances," *ASME Journal of Vibration, Acoustics, Stress, and Reliability in Design*, Vol. 105, No. 4, Oct. 1983, pp. 456-460.
5. Benson, R.C., "Observations on the Steady-State Solution of an Extremely Flexible Spinning Disk with a Transverse Load," *ASME Journal of Applied Mechanics*, Vol. 50, No. 3, Sept. 1983, pp. 525-530.
6. Benson, R.C., "Nonlinear Bending and Collapse of Long, Thin, Open Section Beams and Corrugated Panels," *ASME Journal of Applied Mechanics*, Vol. 51, No. 1, March 1984, pp. 141-145.
7. Mukhopadhyay, A., Benson, R.C., and Ballard, D.N., "Self-Calibration in Robot Manipulator Systems: Trajectory Deviation Analysis to Determine Load Inertia Parameters," *Proceedings of the 7th Symposium on Engineering Applications of Mechanics (Canada)*, June 1984.
8. Johnson, R.C., and Benson, R.C., "A Basic Two-Stage Decomposition Strategy for Design Optimization," *Journal of Mechanisms, Transmissions, and Automation in Design*, Vol. 106, No. 3, Sept. 1984, pp. 380-386.
9. Johnson, R.C., and Benson, R.C., "A Multi-Stage Decomposition Strategy for Design Optimization," *ASME Journal of Mechanisms, Transmissions, and Automation in Design*, Vol. 106, No. 3, Sept. 1984, pp. 387-393.
10. Benson, R.C., "Convergence Limits and Enhancements for a Spinning Disk in a Slotted Envelope," *ASLE Special Publication 16, Symposium on the Tribology and Mechanics of Magnetic Storage Systems*, Oct. 1984, pp. 103-106.
11. Benson, R.C., "Enhanced Paddle Wheel Inertial Separator and Transporter," *U.S. Patent*, No. 4,475,733, Oct. 1984.
12. Benson, R.C., "Postbuckling Analysis for the Bending of a Long Beam with a Thin, Open, Circular Cross Section," *ASME Journal of Applied Mechanics*, Vol. 52, No. 1, March 1985, pp. 129-132.
13. Darmon, P., and Benson, R.C., "Large Inextensional Deformation of Orthotropic Cantilevered Plates with Distributed Loads," *ASME Journal of Applied Mechanics*, Vol. 52, No. 2, Sept. 1985, pp. 385-388.
14. Brewen, A.A., Benson, R.C., and Piarulli, V.J., "A Simple Procedure for Determining Elasto-hydrodynamic Equilibrium and Stability of a Flexible Tape Flying Over a Recording Head," *ASLE Special Publication 19, Symposium on the Tribology and Mechanics of Magnetic Storage Systems*, Oct. 1985, pp. 43-51.
15. Adams, G.G., and Benson, R.C., "Postbuckling of an Elastic Plate in a Rigid Channel," *International Journal of Mechanical Science*, Vol. 28, No. 3, March 1986, pp. 153-162.
16. Crispino, D., and Benson, R.C., "Stability of a Thin, Rectangular Plate Subjected to Tension and Twist," *International Journal of Mechanical Science*, Vol. 28, No. 6, June 1986, pp. 371-379.
17. Benson, R.C., guest editor, "Applied Mechanics Problems in Industry," *Applied Mechanics Reviews*, Vol. 39, No. 11, Nov. 1986, pp. 1663-1705.

18. Darmon, P., and Benson, R.C., "Numerical Solution to an Inextensible Plate Theory with Experimental Results," *Journal of Applied Mechanics*, Vol. 53, No. 4, Dec. 1986, pp. 886-890.
19. Benson, R.C., and Talke, F.E., "The Transition Between Sliding and Flying of a Magnetic Recording Slider," *IEEE Transactions on Magnetics*, Vol. MAG-23, No. 5, Sept. 1987, pp. 3441-3444.
20. Benson, R.C., and Talke, F.E., "The Stability of a Slider Bearing During Transition from Hydrodynamic to Boundary Lubrication," *ASLE Special Publication 22, Symposium on the Tribology and Mechanics of Magnetic Storage Systems*, Oct. 1987, pp. 6-12.
21. Allaire, P.E., and Benson, R.C., "A Rapid Solution Method for the Compressible Reynolds Equation in Magnetic Recording Applications," *ASLE Special Publication 22, Symposium on the Tribology and Mechanics of Magnetic Storage Systems*, Oct. 1987. pp. 33-39.
22. Cole, K.A., and Benson, R.C., "A Fast Eigenfunction Approach for Computing Spinning Disk Deflections," *ASME Journal of Applied Mechanics*, Vol. 55, No. 2, June 1988, pp. 453-457.
23. Cole, K.A., and Benson, R.C., "A Study of Nonflatness Effects on Spinning Disk Deflections," *Proceedings of the 25th Annual Technical Meeting of the Society of Engineering Science*, June 1988.
24. Benson, R.C., Sundaram, R., and Talke, F.E., "A Study of Acoustic Emission From the Slider/Disk Interface in a 5.25 inch Hard Disk Drive," *STLE Special Publication 23, Symposium on the Tribology and Mechanics of Magnetic Storage Systems*, Oct. 1988, pp. 87-93.
25. Benson, R.C., Chiang, C., and Talke, F.E., "The Dynamics of a Slider Bearing During Contacts Between Slider and Disk," *IBM Journal of Research and Development*, Vol. 33, No. 1, Jan. 1989, pp. 2-14.
26. Chiang, C., Benson, R.C., and Talke, F.E., "The Effect of Head/Disk Design Parameters on the Transition from Sliding to Flying of Winchester-Type Sliders," *IEEE Transactions on Magnetics*, Vol. 25, No. 5, Sept. 1989, pp. 3731-3733.
27. Sundaram, R., and Benson, R.C., "A Green's Function with Improved Convergence for Cylindrically Wrapped Tapes," *STLE Special Publication 26, Symposium on the Tribology and Mechanics of Magnetic Storage Systems*, Oct. 1989, pp. 98-110.
28. Benson, R.C., Benson, W.R., and Sorenson, T., "A Methodology for Designing Projectile Interfaces to Survive Worn Gun Tube Launchings," *Proceedings of the Sixth Army Symposium on Gun Dynamics*, May 1990, pp. 394-411.
29. Sundaram, R., and Benson, R.C., "Tape Dynamics Following an Impact," *IEEE Transactions on Magnetics*, Vol. 26, No. 5, Sept. 1990, pp. 2211-2213.
30. Sundaram, R., and Benson, R.C., "Transient Deflections of Cylindrically Wrapped Tape," *Proceedings of the Japan International Tribology Conference*, Oct. 1990, pp. 1319-1321.
31. Benson, R.C., and Cole, K.A., "Transverse Runout of a Nonflat Spinning Disk," *STLE Special Pub. 29, Symposium on the Tribology and Mechanics of Magnetic Storage Systems*, Oct. 1990, pp. 1-8.
32. Benson, R.C., and Takahashi, T.T., "Mechanics of Flexible Disks in Magnetic Recording," *ASME Press, Advances in Information Storage Systems*, Vol. 1, April 1991, pp. 15-35.
33. Benson, R.C., "Tape Tenting With a One-Sided Constraint," *ASME Journal of Applied Mechanics*, Vol. 58, No. 2, June 1991, pp. 484-492.
34. Benson, R. C., and D'Errico, "The Deflection of an Elastic Web Wrapped Around a Surface of Revolution," *Mechanics of Structures and Machines*, Dec. 1991, pp. 457-476.
35. Stolte, J., and Benson, R.C., "Dynamic Deflection of Paper Emerging from a Channel," *ASME Journal of Vibrations and Acoustics*, Vol. 114, No. 2, April 1992, pp. 187-193.

36. Benson, R.C., Smith, D.P., Madsen, D.M., and Fung, S., "Magnetic Tape Tenting: Modeling and Experiments," *ASME Press, Advances in Information Storage Systems*, Vol. 4., 1992, pp. 63-72.
37. Benson, R.C., "The Interfacial Mechanics of a Tape Wrapped Around a Flexible, Bumpy Roll," *STLE Special Publication 35, Symposium on the Tribology and Mechanics of Magnetic Storage Systems*, Oct. 1992, pp. 11-16.
38. Stack, K.D., and Benson, R.C., "A Study of Friction Feed Paper Separation," *Journal of Engineering for Industry*, May 1993, pp. 236-241.
39. Benson, R.C., Chiu, H.C., LaFleche, J., Stack, K.D., "Simulation of Wrinkling Patterns Due to Non-Uniform Transport Conditions," *Proceedings of the Second International Web Handling Conference*, Oklahoma State University, June 1993.
40. Diehl, T., Stack, K.D., and Benson, R.C., "A Study of Three-Dimensional Nonlinear Nip Mechanics" *Proceedings of the Second International Web Handling Conference*, Oklahoma State University, June 1993.
41. Stack, K.D., and Benson, R.C., "The Effects of Axial Variation in Nip Mechanics," *Proc. of the Second International Conference on Advanced Mechatronics*, Meiji University, Tokyo, Japan, August 1993, pp. 731-735.
42. Stolte, J., and Benson, R.C., "An Extending Dynamic Elastica: Impact With a Surface," *ASME Journal of Vibration and Acoustics*, Vol. 115, July 1993, pp. 308-313.
43. Müftü, S., and Benson, R.C., "Numerical Simulation of Tape Dynamics in Helical-Scan Recording," *IEEE Transactions on Magnetics*, October 1993, pp. 3927-3929.
44. Chiu, H.C., Benson, R.C., Fiscella, M.D., and Burns, S.J., "Mechanical and Thermal Wrinkling of Polymer Membranes," *ASME Journal of Applied Mechanics*, March 1994, pp. 67-70.
45. Chiu, H.C., Burns, S.J., Fiscella, M.D., and Benson, R.C., "A New Model for Deformation Kinetics of Polyethylene Terephthalate Films," *Journal of Macromolecular Science*, Vol. B33, No. 1, 1994, pp. 87-104.
46. Funkenbusch, G.M.T., Benson, R.C., Chapman, J.E., and Cox, I., "Deflection of a Soft Contact Lens Pressed Against the Eye," *13th Southern Biomedical Engineering Conference*, University of the District of Columbia, Washington, DC, April 1994, pp. 907-910.
47. Müftü, S., and Benson, R.C., "A Numerical Solution for the Transient Displacement of a Circumferentially Moving Cylindrical Shell," *ASME Journal of Vibration and Acoustics*, Vol. 116, No. 4, October 1994, pp. 567-572.
48. Stack, K.D., Benson, R.C., and Diehl, T., "The Inverse Elastica Problem and Its Application to Media Handling," *Proceedings of the Symposium on Inverse Problems in Mechanics*, ASME Winter Annual Meeting, Chicago, November 1994.
49. Benson, R.C., "The Slippery Sheet," *ASME Journal of Tribology*, Vol. 117, No. 1, Jan. 1995, pp. 47-52.
50. Benson, R.C., LaFleche, J.E., and Stack, K.D., "Deformation of Highly Compressed Wound Rolls," *Proc. of the Third International Web Handling Conference*, Oklahoma State University, June 1995.
51. Stack, K.D., LaFleche, J.E., and Benson, R.C., "The Effects of Nip Parameters on Media Transport," *Proceedings of the Third International Web Handling Conference*, Okla. State University, June 1995.
52. Müftü, S., and Benson, R.C., "Transient Study of the Two-Dimensional Foil Bearing Problem," *International Tribology Conference*, Yokohama, November 1995.
53. Müftü, S., and Benson, R.C., "Modeling the Transport of Paper Webs Including Paper Permeability Effects," *Advances in Information and Storage Processing Systems, ASME ISPS Subdivision* Vol. 1, Nov. 1995, pp. 247-258.

54. Diehl, T., and Benson, R.C., "Modeling Foamed Elastomeric Tires with Ogden-Hill Strain Energy Functions," *Numerical Implementation and Application of Constitutive Models in the Finite Element Method*, ASME Applied Mechanics Division Book, Number 213, November 1995, pp. 79-94.
55. Benson, R.C., "A Nonlinear Wound Roll Model Allowing for Large Deformation," *ASME Journal of Applied Mechanics*, Vol. 62, No. 4, December 1995, pp. 853-859.
56. Müftü, S., and Benson, R.C., "Videotape Behavior on Rotary Heads: Modeling and Results," *The Journal of the Japanese Society of Tribologists*, December 1995, pp. 13-18 (in Japanese).
57. Müftü, S., and Benson, R.C., "A Study of the Cross-Width Variations in the Two Dimensional Foil Bearing Problem," *ASME Journal of Tribology*, Vol. 118, No. 2, April 1996, pp. 407-414.
58. Funkenbusch, G.M.T., Benson, R.C., "The Conformity of a Soft Contact Lens on the Eye," *ASME Journal of Biomechanical Engineering*, Vol. 118, No. 3, August 1996, pp. 341-348
59. Stack, K.D., Perconti, J., LaFleche, J.E., and Benson, R.C., "A Nonlinear Finite Element Model for Stationary Bar Web Spreading," *Proc. of the Fourth International Web Handling Conference*, Okla. State University, June 1997.
60. LaFleche, J.E., Stack, K.D., Benson, R.C., and Motyka, J., "Ribbon Deformation in Dye Diffusion Thermal Printing," *Proceedings of the International Conference for Information and Precision Equipment*, Japan Society of Mechanical Engineers, Tokyo, July, 1997, pp. 655-661.
61. Wilson, S.L., Belegundu, A.D., Miknis, G.M., Stack, K.D., LaFleche, J.E., Benson, R.C., "Modeling Helmet Impacts Using the Abaqus-Explicit Code Along With Corroboration With Drop Tests," *Proceedings of the Symposium on the Design and Integration of Helmet Systems*, U.S. Army Natick Research Development and Engineering Center, 1997.
62. Müftü, S., Lewis, T.S., Cole, K.A., and Benson, R.C., "A Two Dimensional Model of the Fluid Dynamics of an Air Reverser," *ASME Journal of Applied Mechanics*, Vol. 65, No. 1, March 1998, pp. 171-177.
63. Stack, K.D., LaFleche, J.E., Benson, R.C., and Zinsmeyer, C.D., "The Effects of Media and Platen Design in Digital Imaging," *Journal of Imaging Science and Technology*, Vol. 42, No. 2, March/April 1998, pp. 121-125.
64. Benson, R.C., "Stiff Elastic Tape Wrapped Onto a Drum," *ASME Journal of Applied Mechanics*, Vol. 68, No. 4, December 1998, pp. 870-874.
65. Benson, R.C., Stack, K.D., and Stolte, J., "A Review of Computer Simulation Models for Sheet Transport Through a Copier," *Advances in Information Storage Systems*, Vol. 10, 1999, pp. 173-184.
66. Funkenbusch, G.M.T., and Benson, R.C., "Centering Mechanism of Soft Contact Lenses," *ASME Journal of Biomechanical Engineering*, Vol. 121, No. 2, April 1999, pp. 188-195.
67. Benson, R.C., "The Influence of Web Warpage on the Lateral Dynamics of Webs," *Proceedings of the Fifth International Web Handling Conference*, Okla. State University, June 1999.
68. Benson, R.C., and Mockensturm, E.M., "Mechanics and Tribology of Flexible Media in Information Processing Systems," *CRC Handbook of Modern Tribology*, Volume 2, Chapter 40, 2000, pp. 1549-1591.
69. Menzel, P.J., and Benson, R.C., "Offset During Duplex Printing in Electrophotographic Systems," *Journal of Imaging Science and Technology*, Vol. 45, No. 1, Jan/Feb 2001, pp. 62-68.
70. Benson, R.C., "Lateral Dynamics of a Moving Web with Geometric Imperfection," *ASME Journal of Dynamic Systems, Measurement and Control*, Vo. 124, March 2002, pp. 25-34.

Technical Presentations*

1. "Deflection of a Transversely Loaded Spinning Disk," Department of Mechanical Engineering, University of California, Berkeley, CA, Nov. 1977.
2. "Deflection of a Transversely Loaded Spinning Disk," IBM Research Center, San Jose, CA, Dec. 1977.
3. "Deflection of a Very Flexible Spinning Disk due to a Stationary Transverse Load," Eighth U.S. National Congress of Applied Mechanics, Los Angeles, CA, June 1978.
4. "Deflection of a Very Flexible Spinning Disk due to a Stationary Transverse Load," Dept. of Engineering Science and Mechanics, Penn State University, State College, PA, Feb. 1980.
5. "The Deformation of a Thin, Incomplete, Elastic Ring in a Frictional Channel," ASME Winter Annual Meeting, Washington, DC, Nov. 1981.
6. "A Rapidly Convergent Solution for an Extremely Flexible Spinning Disk with a Transverse Load," Ninth U.S. National Congress of Applied Mechanics, Ithaca, NY, June 1982.
7. "The Steady-State Response of a Cantilevered Rotor with Skew and Mass Unbalances," Design Engineering Technical Conference, Washington, DC, Sept. 1982.
8. "The Steady-State Response of a Cantilevered Rotor with Skew and Mass Unbalances," Mechanical and Aerospace Engineering Department, University of Virginia, Charlottesville, VA, Sept. 1982.
9. "Nonlinear Bending and Buckling of Extremely Flexible Sheets with Application to Office Machinery," Department of Mechanical Engineering, Northeastern University, Boston, MA, April 1983.
10. "Nonlinear Bending and Collapse of Long, Thin, Open Section Beams and Corrugated Panels," Mechanical Technology Section, Reprographics Products Group, Xerox Corporation, Webster, NY, May 1983.
11. "Nonlinear Bending and Buckling of Extremely Flexible Sheets with Application to Office Machinery," Mechanical and Aerospace Engineering Department, University of Virginia, Charlottesville, VA, Feb. 1984.
12. "Nonlinear Bending and Collapse of Long, Thin, Open Section Beams and Corrugated Panels," Summer Meeting of the Applied Mechanics Division of the ASME, San Antonio, TX, June 1984.
13. "Convergence Limits and Enhancements for a Spinning Disk in a Slotted Envelope," ASME/ASLE Lubrication Conference, San Diego, CA, Oct. 1984.
14. "Postbuckling Analysis for the Bending of a Long Beam with a Thin, Open, Circular Cross Section," ASME Winter Annual Meeting, New Orleans, LA, Dec. 1984.
15. "The Mechanics of Paper with Application to Office Machinery," Department of Mechanical Engineering, Texas A&M University, College Station, TX, April 1985.
16. "The Mechanics of Spinning Flexible Disks with Application to Computer 'Floppy' Disks," Department of Mechanical Engineering, University of Colorado, Boulder, CO, April 1985.
17. "Large Inextensional Deformation of Orthotropic Cantilevered Plates with Distributed Loads," ASME/ASCE Mechanics Conference, Albuquerque, NM, June 1985.
18. "The Mechanics of Spinning Flexible Disks with Application to Computer 'Floppy' Disks," Engineering Technology Laboratory, Eastman Kodak Company, Rochester, NY, July 1985.

* This is a listing of technical presentations only. Consequently, the many talks describing administrative units at the University of Rochester, Penn State and Virginia Tech are not listed. Also unlisted are talks given at meetings devoted to the development of expertise in academic administration.

19. "Elastohydrodynamic Equilibrium and Stability of a Flexible Tape Flying Over a Recording Head," Kodak Research Laboratory, Eastman Kodak Company, Rochester, NY, August 1985.
20. "Some Problems of Stability in Paper Handling," Engineering Technology Laboratory, Eastman Kodak Company, Rochester, NY, Sept. 1985.
21. "Some Problems of Stability of a Flexible Tape Flying over a Recording Head," Department of Mechanical and Aerospace Engineering, Cornell University, Ithaca, NY, Jan. 1986.
22. "The Mechanics of a Flexible Spinning Disk: Effects of an Imperfect Geometry on a Sensitive System," Department of Mechanical Engineering, University of California, Berkeley, CA, Oct. 1986.
23. "Motion of Paper in a Copying Machine," Society for Natural Philosophy, Charlottesville, VA, Oct. 1986.
24. "The Mechanics of a Flexible Spinning Disk: Effects of an Imperfect Geometry on a Sensitive System," Center for Magnetic Recording Research, University of California, San Diego, CA, Nov. 1986.
25. "The Transition Between Sliding and Flying of a Magnetic Recording Slider," Center for Magnetic Recording Research, University of California, San Diego, CA. March 1987.
26. "The Transition Between Sliding and Flying of a Magnetic Recording Slider," INTERMAG Conference, Tokyo, Japan, April 1987.
27. "The Transition Between Sliding and Flying of a Magnetic Recording Slider," Magnetic Technology Center, Carnegie Mellon University, Pittsburgh, PA, Sept. 1987.
28. "The Stability of a Slider Bearing During Transition from Hydrodynamic to Boundary Lubrication," ASME/STLE Lubrication Conference, San Antonio, TX, Oct. 1987.
29. "A Rapid Solution Method for the Compressible Reynolds Equation in Magnetic Recording Applications," ASME/STLE Lubrication Conference, San Antonio, TX, Oct. 1987.

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30. "The Role of Flexible Structures in Magnetic Recording," University of Texas, Arlington, Nov. 1987.
 31. "The Role of Flexible Structures in Magnetic Recording," Southern Methodist University, Nov. 1987.
 32. "The Role of Flexible Structures in Magnetic Recording," University of Houston, Nov. 1987.
 33. "The Role of Flexible Structures in Magnetic Recording," Texas A&M University, Nov. 1987.
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34. "An Efficient Method for Computing Spinning Disk Deflections," IBM Research Labs, Almaden, CA, February 1988.
 35. "Flexible Tapes with Moving Loads: A Study of Foundation Stiffness Effects," Center for Magnetic Recording Research, University of California, San Diego, CA, March 1988.
 36. "The Role of Flexible Structures in Magnetic Recording," General Electric Corporate Research Center, Schenectady, NY, June 1988.
 37. "An Efficient Method for Computing Spinning Disk Deflections," Kodak Research Labs, San Diego, CA, June 1988.
 38. "The Role of Flexible Structures in Magnetic Recording," 3M Corporation, Minneapolis, MN Aug. 1988.
 39. "A Fast Eigenfunction Approach for Computing Spinning Disk Deflections," ASME Winter Annual Meeting, Chicago, IL, Nov. 1988.
 40. "Tape Tenting with a One-Sided Constraint," Center for Magnetic Recording Research, University of California, San Diego, CA, March 1989.
 41. "A Green's Function with Improved Convergence for Cylindrically Wrapped Tapes," ASME/STLE Tribology Conference, Fort Lauderdale, FL, Oct. 1989.

42. "Mechanics of a Flexible Spinning Disk," RIT Center for Vibration Engineering, Rochester, NY, Nov. 1989.
43. "Mechanics of a Flexible Spinning Disk," IOMEGA Corporation, Roy, Utah, Dec. 1989.
44. "Transient Tape Deflections in Helical Scan Recording," Center for Magnetic Recording Research, University of California, San Diego, CA, March 1990.
45. "Tape Dynamics Following an Impact," INTERMAG'90, Brighton, England, April 1990, (F.E. Talke from UCSD made the presentation).
46. "Mechanics of Flexible Media in Magnetic Recording," 3M Corporation, Minneapolis, NW, June 1990.
47. "Transverse Runout of a Nonflat Spinning Disk," ASME/STLE Tribology Conference, Toronto, Canada, October, 1990.
48. "Mechanics of Magnetic Recording Devices," Wednesday Evenings at the University Lecture Series, University of Rochester, Rochester, NY, October, 1990.
49. "Transient Deflections of Cylindrically Wrapped Tape," Japan International Tribology Conference, Nagoya, Japan, October, 1990.
50. "Mechanics of Flexible Media in Magnetic Recording," Symposium on Advances in Information Storage Systems, ASME Winter Annual Meeting, Dallas, TX, November, 1990.
51. "Mechanics of a Flexible Spinning Disk," Optical Recording Research and Development Laboratory, Eastman Kodak Company, Rochester, NY, November, 1990.
52. "The Dynamics of Slider Bearings During Contacts Between Slider and Disk," Data Storage Systems Center, Carnegie Mellon University, Pittsburgh, PA, January 1991.
53. "The 'Mysteries' of Magnetic Recording," Keynote speech to visiting Bausch and Lomb Scholars, University of Rochester, March and April, 1991.
54. "Mechanics of Flexible Structures," Bausch and Lomb, Contact Lens Division, Rochester, NY, March 1991.
55. "Plate Tenting With a One-Sided Constraint," ASME Applied Mechanics Division Summer Meeting, Ohio State University, Columbus, OH, June 1991.
56. "Modeling of a Contact Lens," Bausch and Lomb Contact Lens Division, Rochester, NY, Nov. 1991.
57. "Magnetic Tape Tenting: Modeling and Experiments," Symposium on Information Storage Systems, ASME Winter Annual Meeting, Atlanta, GA, Dec. 1991.
58. "Magnetic Tape Tenting: Modeling and Experiments," Carnegie Mellon University, Department of Mechanical Engineering, Pittsburgh, PA, April 1992.
59. "Media Handling Workshop," Media Handling Competency Center, Eastman Kodak Company, Rochester, NY, August 1992. (Half-day workshop presented by R.C. Benson, and three graduate students, K. Stack, J. Stolte, and T. Diehl, summarizing the paper handling modeling capability developed at the University of Rochester.)
60. "The Interfacial Mechanics of a Tape Wrapped Around a Flexible, Bumpy Roll," ASME/STLE Tribology Conference, San Diego, CA, November 1992.
61. "Computer Simulation of Paper Transport Through a Copier," Institute of Paper Science and Technology, Atlanta, GA, Feb. 1993.
62. "Structural Characterization of a Soft Contact Lens," Bausch and Lomb, Rochester, NY, May 1993. (Presentation to B&L sponsors by R.C. Benson, and students M. Tian and F. Duver).

63. "Second Media Handling Workshop," Media Handling Competency Center, Eastman Kodak Company, Rochester, NY, August 1993. (Half-day workshop presented by R.C. Benson, and four graduate students, J. LaFleche, K. Stack, J. Stolte, and T. Diehl summarizing the paper handling modeling capability developed at the University of Rochester.)
64. "The Mechanics of Flexible Structures," Hitachi Corporation, Corporate Research Laboratory, Tskuba, Japan, Aug. 1993.
65. "The Mechanics of Flexible Structures," Matsushita Corporation, Mechanical Engineering Research Laboratory, Osaka, Japan, Aug. 1993.
66. "Why Did the @#\$\$ Copier Jam?" Luchtime Colloquium Series at the Laboratory for Laser Energetics, University of Rochester, Rochester, NY, Sept. 1993.
67. "Analysis of Thin Film Transport With Application to Thermal Printing," ASME Winter Annual Meeting, Symposium on Information Storage and Processing Systems, New Orleans, LA, Dec. 1993.
68. "Why Did the @#\$\$ Copier Jam?" Department of Mechanical Engineering, SUNY, Buffalo, Sept. 1994.
69. "Centering Mechanism of Soft Contact Lenses," Bausch and Lomb Research Center, Oct. 1994.
70. "A Wound Roll Model Allowing for Large Deformation," Eastman Kodak Company Research Labs, Rochester, NY, Oct. 1994.
71. "Mechanical Issues of Digital Thermal Imaging," New York State Science and Technology Foundation Site Visit of the Center for Electronic Imaging, Rochester, NY, Oct. 1994.
72. "The Slippery Sheet," ASME/STLE Tribology Conference, Lahaina, HI, Oct. 1994.
73. "Stresses in a Tightly Wound Tape Pack," UCSD Center for Magnetic Recording Research, San Diego, CA, March 1995.
74. "A Nonlinear Wound Roll Model Allowing for Large Deformation," Department of Mechanical Engineering, Rice University, Houston, TX, April 1995.
75. "A Nonlinear Wound Roll Model Allowing for Large Deformation," ASME IMECE, San Francisco, CA, Nov. 1995.
76. "Why Did the @#\$\$ Copier Jam?" Department of Mechanical Engineering, New Jersey Institute of Technology, Newark, NJ, March 1996.
77. "Mechanics of Digital Imaging," Department of Mechanical Engineering and Applied Mechanics, University of Michigan, Ann Arbor, MI, Dec. 1996.
78. "Computer Simulation of Sheet Transport in Copiers," Symposium on Computer Simulation, Eastman Kodak Company, Rochester, NY, Feb. 1997.
79. "A Review of Computer Simulation Models for Sheet Transport Through a Copier," Keynote address at the International Conference on Micromechatronics for Information and Precision Equipment, Tokyo, Japan, July, 1997.
80. "The Influence of Web Warpage on the Lateral Dynamics of Webs," Fifth International Web Handling Conference, Oklahoma State University, Stillwater, OK, June 1999.
81. "Lateral Dynamics of a Moving Web With Geometrical Imperfection," 11th Symposium on Information Storage and Processing Systems, Santa Clara, CA, June, 2000.
82. "The Deformation and Centering of Soft Contact Lenses in the Precorneal Area," 12th Symposium on the Material Science and Chemistry of Contact Lenses, New Orleans, LA, July, 2001.
83. "The Deformation and Centering of Soft Contact Lenses in the Precorneal Area," Department of Mechanical Engineering, Louisiana State University, Baton Rouge, LA, November, 2001.