

## Frank G. Splitt: Professional Biography and Curriculum Vitae

Frank Splitt was born in Chicago, Illinois where he graduated from Annunciation Grammar School (1944) and St. Philip High School (1948). He attended the city's Wright Junior College for two years and then went on to receive a BSEE from the Fournier Institute of Technology in 1952 and MS and Ph.D. degrees in Electrical Engineering from Northwestern University in 1957 and 1963.

Dr. Splitt joined the Admiral Corporation in 1952 and, in 1954, the Raytheon Manufacturing Company – where he worked on BW & Color TV receiver design. From 1956 to 1967, as a Project Engineer at the Cook Research Laboratories, and later as Manager of Advanced Development and Technology, he led classified R&D programs for U.S Air Force Development and Intelligence Agencies, the Naval Research Laboratories, and the National Security Agency. These programs involved theoretical and experimental studies of weak signal detection, modulation, coding, and synchronization techniques applicable to the development of spread-spectrum, secure communications (COMSEC) systems as well as advanced radar & sonar systems, and the AN/TRD-24 radio controlled Doppler direction finding system. After 1967, as the Director of Engineering for the Cook Electric Company, he researched technology related to telephone Outside Plant products and Information Handling systems as well as serving as the Chairman of its Long Range Planning Committee.

After the acquisition of the Cook Electric Company by Northern Telecom in 1977, he held senior management positions, ranging from Director of Business Development to Vice President of Engineering & Marketing for the Cook Electric Division of Northern Telecom Inc. (NTI). After 1987, as Vice President of Technology Planning for NTI's Central Region, he worked on strategic digital switching and wireless initiatives related to the Ameritech account. Beginning in 1992, as NTI Vice President of Educational and Environmental Initiatives, and under the sponsorship of the International Engineering Consortium (IEC), he worked to foster cooperative industry and academic efforts to create a National Information Infrastructure (NII). He continued this work with NTI support and IEC sponsorship through late 1994. Upon his retirement from NTI in 1993 as Vice President Emeritus, he was appointed the McCormick Faculty Fellow of Telecommunications at Northwestern University's Robert R. McCormick School of Engineering and Applied Science.

Dr. Splitt is a Senior Director of the IEC, having served a member of the Board's Executive Committee, Chairman of the IEC Committee on the Future, and Chairman of the IEC Fellow Awards Committee. He was a member of the University of Illinois at Urbana-Champaign College of Engineering Advisory Board, and chaired their Electrical and Computer Engineering Department Committee. He was also a member of the Accreditation Board for Engineering and Technology (ABET) Industry Advisory Council, the Institute of Electrical and Electronic Engineers (IEEE) Educational Activities Board, and the IEEE Corporate Recognitions Committee.

He has published papers on digital voice & data systems as well as on the protection of communications systems from electrical interference; and he holds several patents in the areas of television and electrical protection. Concerning his work with the IEC, IEEE, and ABET, he published and presented conference papers on both the needs and the future of Engineering Education and helped cast the vision for the outcomes-based ABET EC 2000 and then led the Campaign for Systemic Engineering Education Reform resulting in revisions to EC 2000 that require engineering schools to educate students to meet the needs of the 21<sup>st</sup> Century's global economy. He also published and presented papers on the Information Industry and National Information Infrastructure. He was the General Chairman of the 1986 National Communications Forum, Vice Chairman of SUPERCOMM/ICC '92, Co-Chairman of the 1992 TechNeeds 2000 ComForum and Chairman of the 1992 InfoVision ComForum. He was a regular lecturer in the University of Wisconsin's Department of Engineering Professional Development, as well as in the IEC's Distinguished Lecturer Program.

Dr. Splitt is a member of the IEEE's Education and Communications Societies, the American Society for Engineering Education (ASEE), and The Drake Group. He is: an IEEE Life Fellow, an IEC Fellow, a member of Tau Beta Pi (Eminent Engineer), a member of Eta Kappa Nu and Sigma Xi Engineering Honor Societies, the recipient of the *2006 Robert Maynard Hutchins Award*, and listed in *Who's Who in America*.

Dr. Splitt was designated a Life Member of the McCormick School Advisory Council in 2002. He served on the Electrical and Computer Engineering Department Advisory Board since its inception in the late 1980s. His interests involve research and planning for the future of Higher Education, particularly Engineering Education, the conservation of our environment, and college-sports reform. He and his wife Judy reside in Mt. Prospect, Illinois and in Star Lake, Wisconsin.

## CURRICULUM VITAE

### PROFESSIONAL PREPARATION

Saint Philip H.S., 1948, Wright Junior College, 1950, Fournier Institute of Technology, BSEE, 1952, Northwestern University, MS, Electrical Engineering, 1957 and Ph.D., 1963, Wisconsin Lake Leaders Institute, 2000.

### APPOINTMENTS AND ACTIVITIES

- **2005 – Present**, President, FutureVectors Inc., continued research and planning for the future of Engineering Education in a global economy, environmental conservation, and college-sports reform;
- **1994 – 2005**, President, FutureVectors Inc., McCormick Faculty Fellow, Northwestern University, Vice President Emeritus, Northern Telecom Inc.(NTI), Inc., focused on research and planning for the future of Engineering Education, environmental conservation, and college-sports reform;
- **1993 – 1994**, President, FutureVectors, McCormick Faculty Fellow, Northwestern University, Vice President Emeritus, Northern Telecom Inc. (NTI) – continued work on National Information Infrastructure (NII) initiative with NTI support and International Engineering Consortium (IEC) sponsorship through 1994;
- **1992 – 1993**, NTI VP of Educational and Environmental Initiatives – worked to foster cooperative industry and academic efforts to create a NII under the sponsorship of the IEC;
- **1987 – 1992**, VP of Technology Planning for NTI's Central Region – worked on strategic digital switching and wireless initiatives related to the Ameritech account;
- **1977 – 1987**, Cook Electric Division of Northern Telecom Inc. (NTI) – held senior management positions, ranging from Director of Business Development to VP of Engineering & Marketing, with extensive industry activity involving: standards, publications, and international-level lecture/presentations on the electrical protection of low-voltage, metallic transmission facilities;
- **1966 – 1977**, Electric Company – as Director of Engineering he led the development of the AN/TRD-24 radio-controlled Doppler direction finding system used in the Air Force 407L Tactical Air Traffic Control System's AN/TSW-7 "instant- airport;" researched technology related to telephone Outside Plant products & Information Handling systems, and chaired the Long Range Planning Committee;
- **1956 – 1966**, Cook Electric Company – As Project Engineer at the Cook Research Laboratories, and later as Manager of Advanced Development & Technology and Principal Investigator, he led classified R&D programs for the U.S Air Force Development and Intelligence Agencies, the Naval Research Laboratories, and the National Security Agency involving theoretical and experimental studies of weak-signal detection, modulation, coding, and robust synchronization techniques applicable to the development of spread-spectrum, secure communications (COMSEC) systems as well as advanced radar & sonar, and direction finding systems; Chaired the Advanced Research Projects Planning Team, 1964-1965;
- **1952 – 1956**, Admiral Corp. and Raytheon Mfg. Co. – did BW & Color TV receiver design work.

### PRESENT SERVICE ACTIVITIES

- **The Drake Group** – Member and advisor, [www.thedrakegroup.org](http://www.thedrakegroup.org) ;
- **Town of Plum Lake, Vilas County, WI** – Co-Chair of the Town Lakes Committee;
- **Ballard-Irving-White Birch Lakes Association, Inc.** – Member of the Board of Directors (Past President);

### PAST SERVICE ACTIVITIES

- **International Engineering Consortium (IEC)** – Served as a director, member of the Board's Executive Committee, and Chairman of the Fellow Awards Committee; Served as Chairman of the Committee on the Future, as an IEC Distinguished Lecturer, and Research Evaluator for the 1997 Research Study, *The Wireless Industry and the Coming Personal Communications Services Revolution*, [www.iec.org](http://www.iec.org);
- **Ballard-Irving-White Birch Lakes Association, Inc.** – President of the Ballard, Irving, and White Birch Lakes Association (1997-2008); Served as Program Manager for Wisconsin Lake Management Planning Grant Projects LPL 602 & 603.
- **Northwestern University McCormick School of Engineering and Applied Science** – Served as the McCormick Faculty Fellow of Telecommunications (1993-2005), a Member of the McCormick Advisory Council, appointed a Life Member in 2002, chaired the council's committee for the Irene and Muir Frey Prize for Innovation and Creativity; served on the Electrical and Computer Engineering Department

Advisory Board; and as a member of the advisory committee for the Center for Quantum Devices; served as a Senior Fellow of the Center for Information and Telecommunications Technology, 1990-92, [www.mccormick.northwestern.edu](http://www.mccormick.northwestern.edu);

- **Journal of Engineering Education (JEE)** – Manuscript reviewer;
- **International Journal of Engineering Education** – Manuscript reviewer;
- **Journal of Sustainable Engineering** – Manuscript reviewer;
- **Wisconsin Academy of Science, Arts & Letters** – Served on Advisory Committee for the *Waters of Wisconsin Initiative*;
- **Madison Area Technical College (MATC)** – Served, on behalf of MATC and the Wisconsin Lakes Partnership, to establish and guide the Wisconsin School for Water Resource and Watershed Education – a consortium of academic, state, tribal, and other organizations – in a state-wide educational initiative that will ensure a skilled technical workforce, <http://madison.tec.wi.us>;

#### **PAST SERVICE ACTIVITIES (Continued)**

- **Institute of Electrical and Electronic Engineers (IEEE)** – Served as: Communications Society (Paper) Reviewer, 1966-1969, Member Educational Activities Board, 1994-1995, and Corporate Recognition Committee, 1999-2001, Member of the Low Voltage Protection Standards Committee, 1976-1980, [www.ieee.org](http://www.ieee.org) ;
- **Accreditation Board for Engineering and Technology (ABET)** – Served as a Member of the ABET's inaugural Industry Advisory Council, 1991-1993, [www.abet.org](http://www.abet.org) ;
- **National Science Foundation (NSF)** – Served on Review Panel for proposals submitted to the NSF on Institution-wide Reform of Undergraduate Education in Science, Mathematics, Engineering and Technology, 1996;
- **BELLCORE**, Served on the ISO 9000 Quality Registration Council, 1993-1994;
- **Corporation for National Research Initiatives/NRI** – Served on the Cross-Industry Working Team, 1993;
- **University of Illinois at Urbana-Champaign** – Served as a Member of the College of Engineering Advisory Board, 1986-1996, and Chair of the Electrical and Computer Engineering Department Committee, 1988-1989;
- **University of Southern California Center for Telecommunications Management** – Served on the Advisory Committee for the Telecom Outlook Report, 1991-1997;
- **University of Wisconsin's Department of Engineering Professional Development** – Lectured on protection of telecommunications systems from electrical interference, 1982-1989;
- **Oakton Community College** – Served as Chairman of the Electronics Technology Advisory Committee, 1978-1983;
- **Federal Communications Commission** – Served on the Advisory Committee for Dialer & Answering Devices, 1971-1973.

#### **OTHER AFFILIATIONS**

- **IEEE Communications Society**, [www.comsoc.org](http://www.comsoc.org);
- **IEEE Education Society**, [www.ewh.ieee.org/soc/es/](http://www.ewh.ieee.org/soc/es/) ;
- **American Society for Engineering Education**, [www.asee.org](http://www.asee.org);
- **Nortwoods Coalition for Responsible Stewardship**, [www.ncrs.info/](http://www.ncrs.info/);
- **Wisconsin Academy of Science, Arts & Letters**, [www.wisconsinacademy.org](http://www.wisconsinacademy.org);
- **Foundation for Global Community**, [www.globalcommunity.org](http://www.globalcommunity.org);
- **Call to Action**, [www.cta.usa.org](http://www.cta.usa.org)
- **Wisconsin Lake Leaders Institute CREW III**, [www.wlli.org](http://www.wlli.org)

#### **AWARDS and Recognition**

- The Drake Group's *Robert Maynard Hutchins Award* , "for his courageous defense of academic integrity in collegiate sports," 2006;
- Northwestern University Beta Tau Chapter of Eta Kappa Nu, Notable Alumni, 2005;
- IEEE Life Fellow, for leadership in and contributions to the protection of communication systems from the effects of electrical interference;
- IEC Fellow, authority on telecommunications systems and futurist;
- Tau Beta Pi (Eminent Engineer), Eta Kappa Nu, and Sigma Xi Engineering Honor Societies;
- Cook Research Laboratories Resident Fellow (at Northwestern University), 1960;
- Arthur J. Schmitt Foundation Scholarship to the Fournier Institute of Technology, 1950-1952;
- Listed in *Who's Who in America*;
- Wisconsin Lakes Partnership Certificate of Appreciation for Outstanding Lake Stewardship, 2001.

**PUBLICATIONS, CONFERENCE PAPERS & ADDRESSES** – See *The Drake Group Webpage* for a complete listing of and links to the author's essays and commentaries on college sports.

The Town of Plum Lake's Signage Initiative: An Example of National-Local Synergy, TPL Newsletter, Feb. 2009.

Trail decision gratifying to opponents: Advocates will keep up effort, *The Country Today*, [in my opinion], Page 6A, Wednesday, May 7, 2008,

REFLECTING BACK: Some Recollections on the Inaugural ABET Industry Advisory Council by Frank G. Splitt, Chapter 6, *The Path to Reform, 1989-2000*, pp. 232-235, *ABET 75th Anniversary Retrospective: A Proud Legacy of Quality Assurance in the Preparation of Technical Professionals*, Edited by John W. Prados, ABET, Inc., 2007.

The Sloey-Splitt ATV Letters, *Selected Documents Reflecting Opposition to Proposed ATV Trails in the NHAL State Forest*, Compiled by: *Northwoods Citizens for Responsible Stewardship*, August 20, 2007, <http://www.ncrs.info/>.

The U.S. Congress: New Hope for Constructive Engagement with the NCAA and Intercollegiate Athletics, *The Montana Professor*, Vol. 17, No. 2, Spring 2007, [mtprof.msun.edu/Spr2007/splitt.html](http://mtprof.msun.edu/Spr2007/splitt.html), [http://thedrakegroup.org/Splitt\\_Montana\\_Professor.pdf](http://thedrakegroup.org/Splitt_Montana_Professor.pdf)

The U. S. Congress, Higher Education, and College Sports Reform, *The Interface* (ASEE-IEEE Joint Newsletter), April 2007, [http://thedrakegroup.org/Splitt\\_The\\_Interface.pdf](http://thedrakegroup.org/Splitt_The_Interface.pdf)

Fish Predation and Trapping for Rusty Crayfish Control on Plum and Star Lakes: A Commentary, March 1, 2007, [http://www.vilaslandandwater.org/ais\\_pages/ais\\_species\\_rusty\\_crayfish\\_page.htm](http://www.vilaslandandwater.org/ais_pages/ais_species_rusty_crayfish_page.htm)

**PUBLICATIONS, CONFERENCE PAPERS & ADDRESSES (Continued)**

National-Local Synergy is the Key for Stop Aquatic Hitchhikers!, December 21, 2006, <http://protectyourwaters.net/news/display.php?id=5129>

Some Recollections on the Inaugural ABET Industrial Advisory Council, *Interface*, November 2006.

Modern-Day Warfare: It's All about STEMs Literacy in a Global Context, *The Interface*, November 2005. \_Also see: Facing up to global realities, *Inside Higher Ed*, <http://insidehighered.com/news/2005/10/14/stem>, October 14, 2005.

Classroom Techniques to Promote Engineering Solutions for a Sustainable Future, With CalPoly's Vanasupa, Linda (prime) and Chen, Katherine C., presented at the International Union of Materials Research Societies, Singapore, July 3-5, 2005 (accepted August 2005, for publication in *J. Materials Education*).

Cultivating Sustainable Thinking in Engineering Students: Effective methods to inspire sustainable engineering solutions, With(CalPoly's Vanasupa, Linda (prime) and Chen, Katherine C., submitted June 2005 for publication in the *International J. Engineering Education*.

Revised ABET EC 2000: Helping to Close the Environmental Literacy Gap and More, *The Interface*, April 2005.

Engineering Education Reform: Signs of Progress, *International Journal of Engineering Education*, Vol. 20, No. 6, p.1005-1011, December 2004.

Embedding Sustainability into Curricula: Practicable steps from an engineering perspective, With CalPoly's Vanasupa, Linda (prime), Education for Sustainability-West Regional Conference, October 8, 2004.

The Faculty-Driven Movement to Reform Big-Time College Sports, the Sequel to the Brief: Reclaiming Academic Primacy in Higher Education, IEC Publications, July 2004.

Curricula For A Sustainable Future: A proposal for integrating environmental concepts into our curricula (With CalPoly's Vanasupa, Linda (prime), Material Research Society Conference Paper, April 13, 2004, on line at [www.mrs.org](http://www.mrs.org)).

The Fraying Web of Life and Our Future Engineers, Keynote Address, SPIE Conference, January 26, 2004.

Reclaiming Academic Primacy in Higher Education: A Brief on Working for Reform in Intercollegiate Athletics and Engineering Education, December 2003, IEC Publications.

Systemic Engineering Education Reform: It's About Time, Plenary address, NSF Share the Future IV Conference, March 16, 2003.

Systemic Engineering Education Reform: A Grand Challenge, The Bent of Tau Beta Pi, Spring 2003.

Challenge to Change: On Realizing the New Paradigm for Engineering Education, *Journal of Engineering Education*, April 2003.

Engineering Education Reform: A Trilogy, International Engineering Consortium, Chicago, IL, October 2002: also published as a three-part series in the April, August and November 2003 issues of the ASEE-IEEE Joint Newsletter, *The Interface*.

Environmentally Smart Engineering Education: A Brief on a Paradigm in Progress, *Journal of Engineering Education*, October 2002.

IRVING LAKE: A Story about a Shallow Lake, People and Wild Rice, 21<sup>st</sup> Annual International North American Lake Management Society Symposium, Madison, WI, Nov. 9, 2001.

An Odyssey of Educational and Environmental Initiatives: From National Information Infrastructure to the Fate of our Inland Lakes and Ecoefficient Design, Keynote Address, Virginia Tech and EPA Sponsored Green Engineering Conference on Sustainable and Environmentally Conscious Engineering, Roanoke, VA, July 30, 2001.

Educational and Environmental Initiatives: Some Recollections, Observations, and Recommendations, IEC Publications, Chicago, IL, March 2001, (Revised manuscript) Green Engineering Conference Record and CD, Virginia Tech, Roanoke, VA, July 2001;

Birge and Juday Data: Application and Reliability Perspectives, Ballard-Irving- White Birch Lakes Association, Inc., WI Lake Management Planning Project Grant Program Project Nos. LPL-602 & 613, St. Germain Press, St. Germain, WI, February 13, 2001.

Wisconsin Lakes: A Trilogy, Ballard-Irving-White Birch Lakes Association, Inc., WI Lake Management Planning Project Grant Program Project Nos. LPL-602 & 613, IEC Publications, Chicago, IL, December 1, 2000.

Competition for Access Services in the Local Loop, ISBN 0933217226, Professional Education International, Inc., Chicago, IL, July 1996, \_ (with Steven Wildman).

Viewpoint, Partners' Update, Northwestern University Robert R. McCormick School of Engineering and Applied Science, Evanston IL, Winter 1993.

The U.S. Information Industry: Creating 21st Century Infrastructure, American Electronics Association & NEC Executive Symposium on Opportunities in the Information Age, Rosemont, IL, November 4, 1993; NEC Senior Management Meeting on Wireless Directions, November 13, 1993; A Cultural Event Lecture, North Central College, Naperville, IL, May 10, 1994.

Introduction to InfoVision: The Promise of the Future, The ComForum Report on InfoVision: Visions of the Information Age, NEC Publications, Chicago, IL, August 1993.

The U.S. Information Industry – A Call to Action, Teletimes, Spring 1993.

Futurization Process – A Story of Individuals, Organizations, Corporations, Academia, Government, and the Information Industry, World Future Society Conference on Creating the 21<sup>st</sup> Century, Washington DC, June 30, 1993; National Engineering Consortium University–Industry Colloquium, Rosemont, IL, September 26, 1993; ASEE, New England Section, 71<sup>st</sup> Annual Fall Conference, Northeastern University, Boston MA, Oct. 22, 1993.

The U.S. Information Industry – Creating the 21<sup>st</sup> Century, The National Engineering Consortium, Chicago, IL, March 1993. Reprinted by The Aspen Institute for Information Studies, and as part of a compendium of NII related papers by Harvard's John F. Kennedy School of Government; IEEE – USA Information Exchange on Telecommunications as Part of the National Information Infrastructure, Arlington, VA, May 5, 1993; Keynote for the Third Annual Assembly of the Independent Telephone Pioneers Association, Newport Beach, CA, April 15, 1993

#### **PUBLICATIONS, CONFERENCE PAPERS & ADDRESSES (Continued)**

Sustainable Development, Letter re: Creating Our Common Future, The Bent of Tau Beta Pi, Spring 1993.

Education in Transition: Toward Creating Our Common Future, InfoVision ComForum, Rosemont IL, November 19, 1992.

Toward Creating Our Common Future, SUPERCOMM / ICC'92, Plenary Session, Chicago IL, June 15, 1992.

The Information World of the 21<sup>st</sup> Century, InfoVision ComForum, Rosemont IL, November 19, 1992.

A New Industry-University Initiative: A Call to the Business & Academic Sectors of the Information Industry for a National High Technology Agenda, ABET Annual Meeting, San Antonio, TX, October 29, 1992; ECF '93 University-Industry Colloquium Washington, D.C., May 9, 1993.

The Industrial Needs of the Engineer in the 21<sup>st</sup> Century: An Update, ABET Annual Meeting, San Antonio, TX, October 29, 1992; ECF '93 University- Industry Colloquium Washington, D.C., May 9, 1993; NCF '93 University–Industry Colloquium, Rosemont, IL, September 26, 1993; ASEE, New England Section, 71<sup>st</sup> Annual Fall Conference, Northeastern University, Boston MA, Oct. 22, 1993.

Creating Our Common Future – Reflections on the 4 Es: Environment, Education, Energy, and Economics, NCF'91

University- Industry Colloquium Monograph, NEC Publications, Chicago, IL, April 1992; Proceedings of the April 3, 1992 Graduate Business Conference, Indiana University; The Bent of Tau Beta Pi, Fall 1992. The paper served as the basis for addresses in January 1992 at Northwestern University, in March 1992 at the University of Illinois at Chicago and the Western Society of Engineers, in May 1992 at Northeastern Illinois University, and a keynote at the 20<sup>th</sup> Annual ACM sponsored Computer Science Conference, in September 1992 at Clemson University, and in June 1993, at the Society of Women Engineers National Convention. It was also used as one of the background documents for the 1994 NSF Workshop on Engineering Education and the 1998 Engineering Foundation Conference on Realizing the New Paradigm for Engineering Education.

Learn How to be Evergreen. Contribution to Real World 101: What Some Engineers in Industry Want Your Students, and You, to Know, ASEE PRISM, Vol. 2, No. 2, October 1992. (Cover story composed by ASEE PRISM Editor with other contributions).

The New Reality: A Call for Leadership, The Bent of Tau Beta Pi, Spring 1991 – adapted from a speech delivered at the Illinois Alpha Chapter initiation banquet at the University of Illinois at Urbana-Champaign on November 9, 1990. Addresses at the 1988 & 1991 National Engineering Consortium Internship Program Colloquies at the Illinois Institute of Technology, the September 21, 1988 Industry-Day banquet at Notre Dame University, and the April 17, 1988 Eta Kappa Nu banquet at Marquette University were based on essentially the same material.

Environment 2021: Will We Be Able to Make or Use Anything?, (with others), NEC 2021 AD: Visions of the Future ComForum, Phoenix, AZ, March 14, 1991 (See 2021 AD: Visions of the Future, The ComForum Summary and Research Report, National Engineering Consortium, Chicago, IL, 1991).

Technical Solutions – A Perspective, NCF '87 University Faculty Program, Rosemont, IL September 27, 1987.

The Experts Talk About Protection, Telephone Engineer and Management, June 1, 1987, (Special Report composed and edited by Alan Stewart with other contributors).

The Industrial Needs of the Engineer in the 21<sup>st</sup> Century, Tau Beta Pi Conference on The Renaissance Engineer 21<sup>st</sup> Century, Urbana-Champaign, IL, November 15, 1986; Fifth Annual National Electrical Engineering Department Heads Meeting, San Diego, CA, March 20, 1989; 1991 Annual Conference of the ASEE, New Orleans, LA, June 19, 1991. National Engineering Consortium Distinguished Lectures at Marquette University, April 18, 1988; Wayne State University, November 16, 1988; the Milwaukee School of Engineering, April 14, 1989; the University of Colorado at Denver, January 28, 1990; Virginia Polytechnic Institute and State University, Feb.6, 1990; and the University of Minnesota at Duluth, September 21, 1991.

Too Few Generalists: A Problem for Engineering Education, Chairman's address at the 1986 National Communications Forum, Rosemont, IL, September 28, 1986.

Remote Isolation Devices: Present Status and Future Directions, Proceedings of the IEEE Communications Society International Conference on Communications, pp. 716-723, Chicago, IL, June 1985; Symposium on Customer Service and Network Support, Longboat Key, FL, April 17, 1984.

Electrical Protection of End Terminal Equipment Complexes, Proceedings of the International Telephone Exposition and Symposium, Vol. 2, pp. 499-506, September 15, 1981. Also, Telephone Engineer and Management, pp. 78-84, February 1, 1982.

Modern Mainframe Protector/Connector Technology, United States Independent Telephone Association Showcase Technical Seminar, February 18, 1981.

Protection of Digital Offices and End Terminal Equipment Complexes, University of Wisconsin - Extension Workshop on Surge Protection of Telecommunications Systems, April 1980 and June 1981.

Electrical Protection of Digital Offices and Equipment Complexes, Proceedings of the Pacific Telecommunications Conference, pp 3C41-3C52, January 1980. Also, Telephone Engineer and Management, Part 1, March 1, 1980, pp. 118-122, Part 2, pp. 90-95, March 15, 1980.

Overcurrent Protection Techniques, United States Department of Agriculture Rural Electrification Administration Switching Equipment Protection Seminar, May 1979.

Design Parameters for Three-Electrode Protectors, North Carolina Independent Telephone Association Fall Conference on Gas Tube Protection, November 20, 1973.

Gas Tube Application Considerations, United States Independent Telephone Association Convention Seminar on Gas Tubes, 1972.

#### **PUBLICATIONS, CONFERENCE PAPERS & ADDRESSES (Continued)**

Design and Analysis of a Linear Phase-Locked Loop of Wide Dynamic Range, IEEE Transactions on Communication Technology, Vol. COM-14, No. 4, pp. 432-440, August 1966.

Digital Communications, Chicago Technical Societies Council Operation Interface, Morton Grove, IL, December 13 & 15, 1965.

Combined Frequency and Time-Shift Keyed Transmission Systems, IEEE Transactions of the Professional Technical Group on Communications Systems, Vol. CS-11, No. 4, pp. 414-421, December 1963.

A Note on the Word Error Probability Associated with a Sequence of Digits Having Unequal Error Probabilities, IEEE Transactions of the Professional Technical Group on Communications Systems (Correspondence), Vol. CS-11, No. 4, pp. 492-493, Dec. 1963.

Limit for the Probability of Error for Largest-of- Selection, IEEE Transactions of the Professional Technical Group on Communications Systems (Correspondence), Vol. CS-11, No. 4, pp. 494-496, December 1963.

Comparative Performance of Digital Data Transmission Systems in the Presence of CW Interference, IRE Transactions on Communications Systems, Vol. CS-10, No. 2, pp 169-177, June 1962. Also, 1962 IRE International Convention Record, Part 8.

Am I Wasting Company Time in School?, Vantage Magazine, pp.14-15, July 1960 (As told to Marge Silsbee).

Weak Signal Detection Properties of the Two-Receiver Radiometer, AIEE-IRE Student Paper Contest, Chicago, IL, February 20, 1958.

#### **CONFERENCES, FORUMS & SEMINARS**

Chairman, University-Industry Colloquium, Wireless Engineering ComForum, San Diego, CA, November 5, 2002.

Member, Advisory Committee for the 3rd National Conference on Science, Policy and the Environment of the National Council for Science and the Environment, *Education for a Sustainable and Secure Future*, January 30-31, 2003, Washington, D.C., [www.cnie.org](http://www.cnie.org) ;

Co-Chairman/Organizer, NCF '93 University-Industry Colloquium, Rosemont, IL, September 26, 1993;

Chairman, 1992 InfoVision ComForum, *Visions of the Information Age*, Orlando, FL, November 19-20, 1992;

Vice Chairman, SUPERCOMM/ICC '92, Chicago, IL, June 15-18, 1992;

Co-Chairman, 1992 TechNeeds 2000 ComForum, *Technology and Customer Needs of the 21<sup>st</sup> Century*, Rosemont, IL, June 1992;

Chairman/Organizer, 2021 AD: Visions of the Future ComForum Session on *Environment 2021: Will We Be Able to Make or Use Anything?*, Phoenix, AZ, March 14, 1991;

Chairman, NCF'88 ComForum Awards Committee, 1988;

Chairman, NCF'87 Executive Advisory Council, 1987;

Chairman/Organizer, Access Network Symposium Session, *Enhancement of the Access Network: Future Development of Distribution Facilities*, Atlanta, GA, September 16, 1987;

General Chairman, 1986 National Communications Forum (NCF'86), Rosemont, IL, September 29-October 1, 1986;

Director, NCF'85 Telecommunications Networks Institute, Chicago, IL, October 1985;

Director, NCF'84 Telecommunications Networks Institute, Chicago, IL, October 1984;

Member, NCF'83 New Technology Seminars Program Committee, October 1983;

Organizer, NCF'82 Telecommunications Networks Seminars, October 1982;  
Chairman/Organizer, NCF'81 New Technologies Seminars Program, October 1981;  
Chairman/Organizer, NCF'79 Seminar, *The Impact of Modern Telephone Technology on the Exchange Plant*, October 1979; Chairman/Organizer, Technical Session, *Mass Storage Systems* at the 1975 National Electronics Conference, October 1975;  
Chairman/Organizer of Technical Seminar, *New Developments in Key Telephone Systems* at the 76<sup>th</sup> Annual Convention of United States Independent Telephone Association, October 1973.

#### **REPORTS Re: DOD RESEARCH & DEVELOPMENT CONTRACTS**

Correlation Study of Redundant Signals (U), Principal Author of Interim Reports and Final Report on Air Force Contract No. AF 30 (602)-4219, 1966-1967.  
Investigation of Synchronization Techniques for Aerospace COMSEC (U), Principal Author of Interim Reports and Final Technical Documentary Reports FAL-TR-65-292 on Air Force Contract No. AF33 (657)-11387, 1963-1965.  
Laboratory Investigation of a Radar Technique to Improve Target Visibility in Certain High Power Jamming Environments (U), Co-author of Special Report SPR-1 on Navy Contract NOW650469C, AD-366 364L, July 1965.  
Study of Extremely High Jam-Resistant Communication System Techniques for Application in Satellite Ground Links (U), Principal Author of Interim Reports and Final Technical Documentary Report ASD-TRD-63-368, AD 340 029 on Air Force Contract No. AF33 (657)-7958, 1962-1963.  
Study to Provide Protection against Detection and Jamming for High Data Rate Communications (U), Principal Author of Technical Documentary Reports ASD 61-72 and ASD-TDR-63-139 on Air Force Contract No. AF33 (616)-7301, 1961-1963.  
Research Study on Whisper Low Communications Systems (U), Principal Author of the Interim Reports and Author of a Special Report submitted on National Security Agency Contract No. DA18-119-sc-612, 1959-1960.  
Soviet Air Communication Modulation Techniques (U), Author of Final Report on Air Force Contract No. AF33 (600)-36243, 1957-1958  
Detection of Special Signal Transmissions, Co-author of Interim Reports and Final Technical Report RADC-TR-58-12, AD 148569 on Air Force Contract No. AF30 (602)-1541, 1956-1957.

#### **COOK RESEARCH LABORATORIES and COOK TECH-CENTER REPORTS & MONOGRAPHS**

Automatic Processing Techniques for Improving the Quality of Voice Signals Derived from Doppler Type Direction Finders, Cook Tech-Center Monograph CN-5303-1, December 1968.  
Signal Processing Techniques for High Level Spherics, Cook Tech-Center Research Report 603, Oct. 1965 (with A. C. Fleuchaus).  
A Comparison of Two Detection Schemes for a Doppler Shifted Pulse Carrier, Cook Tech-Center Monograph EW-602, May 1965.  
Effective Noise Bandwidth for Radio Receiving Systems, Cook Tech-Center Monograph RC-601,  
Antijam Improvement with Encoded Data Transmission Systems (U), Classified Cook Tech-Center Research Monograph E-00782, August 1961.  
A Note on 90° Scattering of a Plane Wave from a Spherical Particle, Cook Research Laboratories Monograph, RC 128, June 9, 1958.

#### **DISSERTATION AND THESES**

An Investigation of Multiple Time Shift Keyed Transmission Systems, Doctoral Dissertation, Northwestern University, Advisors: Robert E. Beam and Arnold J. Siegert, June 1963.  
An Investigation of the Weak-Signal Detection Properties of the Two-Receiver Radiometer, Master of Science Thesis, Northwestern University, Advisor: Robert E. Beam, August 1957.  
Fundamental Principles of Servomechanisms, Bachelor of Science Thesis, Fournier Institute of Technology, Advisor: Virgil Disney, June 1952.

#### **PATENTS**

Apparatus for Providing Positive Protection for Station Protectors for Telephone Systems, (Canadian) 1, 262, 560, October 31, 1989.  
Surge Arrester with Improved Impulse Ratio, 4,293,887, October 6, 1981 (with D. Turner).  
Connector Assembly for Telephone Distribution Equipment, 4,179,170, December 18, 1979 (with C. Cwirzen, W. Hines and A. Ladd).  
Methods of Assembling and Mounting Three-Electrode Gas Tube Arrester, 4,063,339; December 20, 1977 (with E. Scheithauer).  
Station Protector with a Three-Electrode Gas Tube Arrester, 4,009,421, February 22, 1977 (with E. Scheithauer).  
Two Pair Station Protector, 3,961,229, June 1, 1976.  
Connector Block for Telephone Equipment, 3,936,133; February 3, 1976 (with W. Frantz).  
Transformer Coupling of Color Signal, 2,910,529, October 27, 1959.  
Signal Separator Circuit for Television Receivers, 2,868,873, January 13, 1959