Long-form Resume for Neil F. Chamberlain, Ph.D.

Summary:

Current Position: Flight Communications Systems Section,
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109

Background:

Communications	Telecommunications and Systems Engineering; Relay Operations
Electromagnetics	Antenna Analysis, Design & Testing; Antenna Arrays; Microwave Engineering
Radar	Signal Processing; Polarimetry; Target Classification; Ground Penetrating Radar

Education:

M.S., Ph.D. (E.E.)	The Ohio State University ElectroScience Laboratory, Columbus, Ohio	1984, 1989
B.Sc. (E.E. with honors)	King's College, London University, London, UK	1981

Experience:

33 years post-PhD work in communications systems, antennas, and radar:
19 years as an engineer and manager with JPL's Flight Communications Systems Section
14 years as an educator at the South Dakota School of Mines & Technology (SDSM&T)

Manager	Flight Communications Systems Section, JPL, Pasadena, CA	2004 – present
& Senior Engineer	JPL Chief Telecom Engineer	4/22 – present
	EM Analyst: Europa REASON Instrument HF Antenna	2016 – present
	Telecom System Engineer: CADRE Autonomous Lunar Rover Mission	2021 – present
	Project Manager: Deep Space Network (DSN) RF-Optical Hybrid Ground Station	2019 – 2021
	Task Manager: Trace Gas Orbiter Electra Relay Operations	2016 – 2021
	Lead: Universal Space Transponder Integration and Test for SPRITE	2017
	Analyst: MRO Relay Throughput Investigation Team	2019
	Task Manager: FINDER Heartbeat Detecting Radar	2015 – 2018
	Task Manager: MAVEN Electra Relay Operations	2011 – 2021
	Task Lead: DESDynI / NISAR Synthetic Aperture Radar Antenna	2009 – 2015
	EM Analyst: Multipath Anomaly, MSL-MRO Commissioning Team	2012
	EM Analyst: Multipath Anomaly, GRAIL Ext. Mission and Decommission	2012
	Telecommunication Systems Lead: SAGE New Frontiers Proposal	2011
	Telecommunication Systems Lead: Eagle Discovery Proposal	2010 – 2011
	Acting Supervisor: Antenna Research and Formulation Group	2010 – 2011
	Cognizant Engineer: Juno Microwave Radiometer Antennas	2007 – 2010
	Cognizant Engineer & Contract Technical Manager: UAVSAR Radar Antenna	2004 – 2008
	Cognizant Engineer: JPL / AFRL Space-Based Radar Antenna	2003 – 2005
NASA Faculty Fellow	Jet Propulsion Laboratory, Pasadena, CA	2002, 2003
Professor	Electrical and Computer Engineering Dept., SDSM&T, Rapid City, SD	1990 – 2003
	Teaching in communication systems, signal processing, and electromagnetics	
	Research in ground penetrating radar	
Senior Researcher	Comuniq Inc., Rapid City, SD	2000 – 2002
	Consulting and market research in voice-over-IP telephony	
President	Chamberlain Thompson Engineering Systems (ChTES) Inc.	1996 – 2000
	SBIR-funded research in ultra-wideband beam-steered subsurface radar	
Graduate & Post-	The Ohio State University ElectroScience Laboratory, Columbus, OH	1983 – 1989
Doctoral Researcher	Research in radar polarimetry, RCS measurements, radar target classification	
Graduate Engineer	Marconi Space and Defence Systems, Portsmouth, UK	1981 – 1982
	Power amplifier designer (SINCGARS)	

Missions Supported:

CADRE	Telecom system engineering and antenna design for autonomous rover mission
	Ground Penetrating Radar antenna
COSMIC-II	GPS radio occultation instrument antenna design and analysis
EcoStress (ISS)	Link budget review board subject matter expert

Europa Clipper	REASON HF antenna array design and analysis
GRAIL	Uplink anomaly investigation; decommissioning link analysis
GRACE Follow On	GPS radio occultation instrument antenna design and analysis
InSight	UHF relay operations, compatibility testing, and commissioning via MAVEN and TGO; landing radar antenna analysis and verification; entry descent & landing (EDL)
ISARA	Ka-band feed array design and analysis
Jason III	Delivery manager for VDA qualification testing
Juno	Delivery of A1 and A2 antenna arrays for Microwave Radiometer instrument
Mars 2020	UHF relay operations, compatibility testing, and commissioning via MAVEN and TGO; Delivery manager for LDPC firmware & software updates for MAVEN and TGO
Mars Science Laboratory	UHF relay operations, compatibility testing, and commissioning via MAVEN and TGO
Mars Reconnaissance Orbiter (MRO)	Anomaly investigations: multipath dropout; ultra-stable oscillator; EDL dropout
MAVEN	Relay operations development and Task Manager
NISAR	Synthetic Aperture Radar instrument antenna lead
Phoenix	Anomaly investigation and redesign of landing radar antenna
Jupiter Icy Moons Explorer	RIME transmitter network calibration, uncertainty analysis, and verification
Trace Gas Orbiter (TGO)	Relay operations development and Task Manager
UAVSAR	Delivery of active phased array aperture and transmit/receive modules

Proficiencies:

Managerial

Proposal writing and business development, including subsystem lead of institutional proposals and internal R&D proposals
Mentoring of external research initiatives and junior team members, including Small Business Innovation Research
Principal investigator and collaborator for internally funded research programs
Formulation and management of budget and schedule to meet project goals and deadlines
Resource, schedule, and configuration management
Briefings to project management and line management
Presentations at gating reviews (MCR, SRR, PDR, CDR, HRCR, SIR, MOR, ORR, etc.)
Development and negotiation of technical requirements for contracted procurements
Contract technical management
Formulation of procedures for assembly and test of flight hardware
Reporting, management, and timely resolution of problems, anomalies, and failures
Coordination of multi-disciplinary teams to deliver flight hardware

Technical

Electromagnetic modeling and optimization of antennas using full-wave computational electromagnetic (CEM) software such as HFSS, GRASP, Designer, CST Microwave Studio, and co-simulation using CEM software and circuit-based simulators
Active phased array antenna design, fabrication, integration and test
Antenna measurements, including compact range, far-field range, near-field range and pulsed measurement of active phased arrays
Microwave measurements, including vector network analyzer, spectrum analyzer, power meter
Design of automatic test equipment (ATE) for microwave measurements
Telecom system architecture formulation and design
Statistical evaluation of antenna sub-systems to meet requirements with manufacturing tolerances, modeling errors, measurement errors, and variations due to environments
Process qualification and testing to meet environmental requirements
Environmental testing of antennas, including vibration testing, thermal testing, and RF measurement of antennas and components during thermal cycling
Electromagnetic susceptibility analysis
RF multipath analysis with accommodated antennas and terrestrial interactions
Statistical analysis of proximity link performance, including limitations due to terrain
Time domain electromagnetics, modeling and testing of ultra-wideband antennas
Development and testing of ground-penetrating radar systems
Development and testing of micro-doppler radar systems for heartbeat and motion detection
Programming, post-processing, and system simulation in MATLAB

Significant Impacts:

DSN RF-Optical

Recruited team of world-leading experts to develop segmented mirror systems for large (64-segment) implementation and small / demo (7-segment) implementation
Redesigned edge sensor electronics system and delivered 7-segment mirror system to assembly, integration and test
Assembly was subsequently installed on DSS-13 antenna for future optical communications

	demonstrations with Deep Space Optical Communications (DSOC) payload on Psyche spacecraft
Europa Clipper	Developed hybrid circuit/finite element co-simulation analysis models for REASON HF (9MHz) dipole antennas, involving extensive defeaturing of highly complex deployment mechanism and circuit modeling of matching network Performed extensive fabrication tolerance analysis in lieu of being able to perform measurements Europa Clipper launches in Oct. 2024, REASON instrument is an ice-penetrating radar that will characterize Europa's ice crust from the near-surface to the ocean
FINDER	Assisted SpecOps Group Inc. in successfully commercializing FINDER heartbeat detecting radar FINDER has been used in the recovery of victims buried in earthquake rubble
Juno	Invented metal patch antenna element (later patented), which addressed a debonding issue with the baseline approach of carbon-loaded Astroquartz honeycomb Delivered 2 flight antennas (A1 and A2) to the Juno Microwave Radiometer (MWR) Instrument Juno has been in orbit around Jupiter since 2016, with MWR returning new science on Jupiter's atmospheric composition Metal patch antenna elements have been adopted by other missions, including NISAR L-band feed array, a future Europa Lander direct-to-Earth X-band communications antenna, and cloud profiling radar incubator initiatives at W-band
Mars 2020	Supported open-loop recording of Mars 2020's entry, descent, and landing (EDL) Delivered firmware and software upgrades to MAVEN and Trace Gas Orbiter spacecraft to implement low-density parity check coding, affording a 70% increase in relay data throughput
MAVEN	Stood up Electra relay operations at JPL, including implementation of telemetry processing workstations on flight network and development of various processing telemetry software tools Participated in UHF compatibility testing with MSL, InSight, Mars 2020, and ESA landers Supported open-loop recording for Mars 2020's EDL Supported emergency commanding of OSIRIS-Rex during orbital insertion around Bennu
MRO	Supported investigation of anomalous UHF relay dropouts following MSL landing by developing multipath fading models to explain dropouts Supported investigation of anomalous UHF relay performance, devising a test program that subsequently pointed to degradation in the ultra-stable oscillator as root cause of the anomaly
NISAR	Developed array-fed reflector concept through extensive trade studies in pre-Phase-A and Phase-A, and then development through Phase-B NISAR launches in 2023 and will provide elevation maps of Earth's land and ice masses 4-6 times a month, facilitating polarimetric repeat-pass interferometry and rapid change detection
UAVSAR	Delivered L-band antenna aperture (6 patch arrays tiles) and was contract technical manager for the delivery of 52 L-band transmit / receive modules to active phased array antenna subsystem UAVSAR has been flying airborne repeat-pass interferometry missions since 2008 (over 1200 flight lines), providing critical data for resource monitoring and impact assessment of hazards such as wildfires and floods

Funded Research:

JPL R&TD	"Antennas for Extreme Frequencies"	2022
JPL R&TD	"Smart Cabling: Wireless Appliqué for Integration and Test"	2016
NASA Instrument Incubator Program	"Three Band Cloud and Precipitation Radar (3CPR)"	2014 – 16
JPL Strategic University Research Partnership	"Broadband Circularly Polarized Antenna Array for Mars Rover Direct-to-Earth Communications" (PI)	2013
JPL Center Innovation Fund	"All-Metal Dual-Polarized W-band Patch Element for Phased Array Antenna Applications" (PI)	2013 2012
JPL R&TD	"Compact 94-GHz Multi-beam Lens Antenna for Miniature Landing Radars" (PI)	2009

Journal Publications and Conference Publications:

N. Chamberlain et al	"Implementing Low-Density Parity-Check Codes in the Mars Relay Network", IEEE Aerospace Conference, Big Sky, MT	2022
with R. Gladden et al	"Preparing the Mars Relay Network for the Arrival of the Perseverance Rover at Mars, IEEE Aerospace Conference, Big Sky, MT	2022
with M. Mohageg et al	"Telescope Metrology and Active Alignment for RF-Optical Hybrid Receiver", Proc. SPIE 11678, Free-Space Laser Communications XXXIII	2021
with N. Lay et al	"On-board Wireless Communications for Spacecraft Test and Operations", IEEE Aerospace Conference, Big Sky, MT	2019
with J. Kovitz et al	"Enhancing Communications for Future Mars Rovers: Using high-performance circularly polarized patch subarrays for a dual-band direct-to-Earth link", IEEE APS Magazine	2017
with C. Edwards et al	"Relay Communications Support to the ExoMars Schiaparelli Lander", IEEE Aerospace	2017

	Conference, Big Sky, MT	
with M. Janssen et al	"MWR: Microwave Radiometer for the Juno Mission to Jupiter", Space Science Reviews	2017
with S. Gao & Y.J. Guo	"Special Issue on Antennas for Satellite Communications", IEEE Transactions on Antennas and Propagation, Guest Editorial	2015
with J. Santos et al	"Single Feed Circularly Polarized Half E-Shaped Array: a Compact Assembly for Dual-Band Direct-to-Earth Communications in Mars Rovers", IEEE APS/URSI Conference, Vancouver, BC, Canada	2015
N. Chamberlain et al	"MAVEN Relay Operations", IEEE Aerospace Conference, Big Sky, MT	2015
N. Chamberlain et al	"A Dual-Polarized W-band Metal Patch Antenna Element for Phased Array Applications", IEEE APS Conference, Memphis, TN	2014
N. Chamberlain & J. Vacchione	"Electromagnetic Modeling of the Proposed DESDynI Synthetic Aperture Radar Antenna", IEEE Aerospace Conference, Big Sky, MT	2014
with D. Bell et al	"MRO relay telecom support of Mars Science Laboratory surface operations", IEEE Aerospace Conference, Big Sky, MT	2014
with B. Ijaz et al	"Gain Limits of Phase Compensated Conformal Antenna Arrays of Non-Conducting Spherical Surfaces using the Projections Method", IEEE Wireless for Space and Extreme Environments (WiSEE) Conference, Baltimore, MD	2013
with G. Sadowy et al	"A cross-track cloud-scanning dual-frequency doppler (C2D2) radar for the proposed ACE mission and beyond", International Geoscience and Remote Sensing Symposium, Melbourne, Australia	2013
with B. Braaten et al	"A Self-Adapting Flexible (SELFLEX) Antenna Array for Changing Conformal Surface Applications", IEEE Trans. APS, Vol. 61, No. 2.	2013
N. Chamberlain et al	"The Proposed DESDynI Array-Fed Reflector Feed", IEEE APS/URSI Conference, Chicago, IL	2012
with B. Braaten et al	"Half-Power Beamwidth of a Self-Adapting Conformal 1 x 4 Microstrip Array", IEEE APS/URSI Conference, Chicago, IL	2012
N. Chamberlain et al	"Single-Layer, All-Metal Patch Antenna Element With Wide Bandwidth", NASA Tech Brief, June 2012	2012
with R. Hughes et al	"Mechanical Development of a Very Non-standard Patch Array Antenna for Extreme Environments", IEEE Aerospace Conference, Big Sky, MT	2012
N. Chamberlain et al	"MAVEN Relay Operations Concept", IEEE Aerospace Conference, Big Sky, MT	2012
N. Chamberlain	"Impulse Testing of Corporate-Fed Patch Array Antennas", IEEE Aerospace Conference, Big Sky, MT	2011
with G. Sadowy et al	"A spaceborne design and airborne demonstration of digitally-beamformed antennas for SweepSAR imaging", IDGA 8th Military Antennas Conference, Washington, DC	2011
N. Chamberlain et al	"Accurate loss measurements of the Juno patch array antennas", IEEE Phased Array Conference, Boston, MA	2010
N. Chamberlain et al	"The DESDynI Synthetic Aperture Radar Array-Fed Reflector Antenna", IEEE Phased Array Conference, Boston, MA	2010
with G. Sadowy et al	"UAVSAR Active Electronically-Scanned Array", IEEE Phased Array Conference, Boston, MA	2010
N. Chamberlain et al	"Juno Microwave Radiometer All-Metal Patch Array Antennas", IEEE APS/URSI Conference, Toronto, Canada	2010
N. Chamberlain et al	"Juno Microwave Radiometer Patch Array Antennas", IEEE APS/URSI Conference, Charleston, SC	2009
N. Chamberlain et al	"Patch Array Antennas for Extreme Space Environments", IEEE APS/URSI Conference, San Diego, CA	2008
with S. Hensley et al	"The UAVSAR instrument: Description and first results", IEEE Radar Conference	2008
N. Chamberlain & G. Sadowy	"The UAVSAR Transmit / Receive Module", IEEE Aerospace Conference, Big Sky MT	2008
N. Chamberlain et al	"The UAVSAR Phased Array Aperture", IEEE Aerospace Conference, Big Sky MT	2006
N. Chamberlain et al	"T/R Module Development for Large Aperture L-band Phased Array", IEEE Aerospace Conference, Big Sky MT	2005
N. Chamberlain et al	"Microstrip Patch Antenna Panel for Large Aperture L-band Phased Array", IEEE Aerospace Conference, Big Sky MT	2005

New Technology Reports:

NTR 49695	"Broadband circularly polarized antenna array for Mars rover direct-to-Earth communications", submitter	2014
NTR 49674	"Ku Band Phased Array Antenna Module", contributor	2014
NTR 49396	"A Dual-Polarized W-band Metal Patch Antenna Element for Phased Array	2013

	Applications", submitter	
NTR 49323	"Deployable Radio Occultation Antenna", contributor	2013
NTR 48756	"Air-Stripline Power Divider / Combiner", submitter	2013
NTR 48710	"Active Electronically-Scanned Array Feed for Parabolic Cylindrical Antennas", contributor	2012
NTR 47503	"UAVSAR Active Electronically Scanned Array", contributor	2010
NTR 46843	"A single-layer, all-metal patch antenna element with wide bandwidth", submitter	2009

Other Publications:

N. Chamberlain	"The Usual Suspects: Troubleshooting Anomalous UHF Relay On Mars Reconnaissance Orbiter In Time For InSight Entry Descent Landing", JPL Seminar	2019

Honors & Awards:

NASA Honor	"For development and flight implementation of low-density parity check during adaptive data rate relay sessions, enabling a factor of 2 increase in Mars relay performance"	2022
JPL Team	"For the successful implementation and deployment of the LDPC decoder on MAVEN Electra"	2022
JPL Team	To the RF-Optical Team "For completing development and JPL Lab testing, and delivery of hardware to DSS-13 for installation"	2022
JPL Team	"For the successful delivery of the Receiver, Transmitter and Matching Network of the RIME instrument to the Italian Space Agency (ASI)"	2020
JPL Voyager	"For his outstanding support to Sections 337 and 334 on the RIME project"	2020
NASA Honor & JPL Team	"For outstanding, innovative effort during the investigation of the MRO Relay Throughput Anomaly, resulting in a successful resolution prior to InSight landing"	2019
NASA Honor	"For exceptional achievement on redesigning the MSL relay process in the era of InSight and non-sun-synchronous relay orbiters"	2019
NASA Honor	"For outstanding communications support during InSight's entry, descent, & landing"	2019
JPL Team	"Successful completion of the End-to-End Data Flow Test between the Mars 2020 Flight System and Mars 2020 Mission System via the Trace Gas Orbiter"	2019
JPL Team	"To REASON Antenna Electrical team for a successful Pre-Integrated Wing Review	2019
JPL Voyager	"Neil Chamberlain was instrumental in setting up the infrastructure of the MAVEN Electra terminal to emergency command Osiris-Rex during asteroid orbital insertion"	2019
JPL Team	"For successfully demonstrated testing of the UST-DS radio in relevant thermal and vibration environments to enable future NASA missions"	2018
NASA Honor	"For the design, fabrication, and test and integration of the Electra UHF Relay Payload on the European Space Agency's ExoMars/Trace Gas Orbiter"	2017
NASA Honor	"For exceptional achievement in planning and executing a test campaign to validate the MAVEN orbiter relay service with Curiosity and Opportunity rovers"	2017
NASA Honor	"For the design fabrication, and test and integration of the Electra UHF Relay Payload on the European Space Agency's ExoMars/Trace Gas Orbiter"	2017
NASA Honor	"For exceptional technical and programmatic performance in the design, development and delivery of the Advanced Microwave Radiometer for Jason-3"	2017
JPL Voyager	"For analysis of the spacecraft multipath effects on the MAVEN UHF antenna radiation pattern and the development of an updated antenna pattern model"	2017
JPL Team	"For outstanding work demonstrating the functionality and capacity of the Electra radio as a relay asset to the Mars Program"	2015
JPL Team	"For successfully completing the development and testing of the NISAR Feed Aperture prototype"	2015
JPL Team	"For excellence in the development and implementation of the Microwave Interferometer (MWI) resulting in successful Instrument and Project CDRs"	2015
NASA Honor	"For delivering on all technical, schedule, and cost commitments through launch, enabling new discoveries of Mars Atmosphere and Volatile EvolutioN (MAVEN)"	2014
NASA Honor	"For design, fabrication and test of the MAVEN Electra UHF Transceiver exceeding required performance"	2014
JPL Ranger	"For successfully leading the development and flight demonstration of parameterized blocks for the BER Sniff tests of MAVEN Electra"	2014
JPL Team	"For successfully completing the transition (of NISAR) to Phase A after a long pre-formulation phase by creating an innovative mission concept"	2014
JPL Discovery	"For setup and check-out of the Maven Electra Operations Facility leading to successful spacecraft TVAC monitoring of the MAVEN Electra"	2013
JPL Team	"Provided extensive data analysis and analytical proofs of actual MSL relay	2013

	performance post-landing"	
NASA Honor	"For outstanding achievement in the operation and successful execution of the Curiosity rover's mission of exploration to the surface of Gale Crater"	2013
JPL Team	"For exceptional contributions to the development and implementation of improved antenna reflector vapor deposited aluminum (VDA) processes"	2013
JPL Spot	"For development of a winning proposal to extend the unique all-metal patch to W-band, a Center Innovation Funded Advance Concept"	2012
Patent	"Metal Patch Antenna", US Patent Number 8,169,371 (Principal Inventor)	2012
NASA Major Space Act	"A Single-Layer, All-Metal Patch Antenna Element with Wide Bandwidth"	2012
NASA Honor	"For outstanding contributions to the successful deployment, delivery and launch of the Juno Microwave Radiometer Instrument"	2012
JPL Mariner	"For outstanding contributions to Section 337 in the capacity of Acting Group Supervisor"	2011
JPL Spot	"For contributions to SAGE Concept Study Report"	2011
NASA Space Act & Tech Brief Initial	"For the development of a significant scientific or technical contribution entitled UAVSAR Active Electronically Scanned Array, NPO 47503-1"	2011
JPL Team	"For outstanding contributions to Juno MWR Antenna Development"	2010
JPL Certificate of Appreciation	"For contributions in resolving significant Juno MWR antenna implementation design problems under significant schedule pressure"	2009
NASA Honor	"For the development and test of the UAVSAR system which was the first airborne L-band synthetic aperture radar with an actively scanned antenna"	2009
JPL Team	"For the successful development and flight test of the UAV Synthetic Aperture Radar on NASA's Gulfstream aircraft for the Earth Science Technology Office"	2008
JPL Outstanding Accomplishment	"For the delivery of a fully tested and specification compliant UAVSAR electronic scanned array antenna aperture. This unit was delivered for a radar system"	2006

Service:

Professional	Member & Senior Member ,Institute of Electrical and Electronic Engineers (IEEE) since 1986 Associate Editor, IEEE APS Special Edition on Antennas for Satellite Communications Reviewer, IEEE APS / URSI, Radio Science Reviewer, JPL SBIR / STTR proposals Reviewer, JPL internal R&D proposals Session Chair, IEEE APS and other conferences
Mentoring	Technical Monitor, MicroLink Devices Phase 2 SBIR, "Integrated L-Band TR Module" Technical Monitor, MicroLink Devices Phase 1 SBIR, "Integrated L-Band TR Module" Technical Monitor, MicroLink Devices Phase 1 SBIR, "InGaP HBT Lift-off for L-band TR Modules" NASA Advisor for "A Small Wearable Conformal Phased Array Antenna for Wireless Communications", Dr. Ben Braaten, Principal Investigator, North Dakota State University, North Dakota EPSCoR JPL Mentor Program, Dr. Mauricio Sanchez Barbetty, May 2011 – Nov 2011

Continuing Education: *Jet Propulsion Laboratory, California Institute of Technology*

Ansys Workshop	Antenna and Cavity Modeling, JPL	2016
Ansys Workshop	Meta Materials Seminar, UC Irvine	2013
IEEE Workshop	Phased Array Antenna Measurements	2010
IEEE Workshop	T/R Module Design and Calibration	2010
JPL Workshop	Tech Rep Interviewing Training	2010
Ansoft Workshop	Advanced Antenna Training (HFSS), Woodland Hills	2008
USC Distance Ed.	EE578, Reflector Antennas, A. Prata, (for credit)	2007
JPL Workshop	Managing Subcontracts Workshop	2007
JPL Workshop	The JPL Task Manager	2006
JPL Workshop	Process Cert and Def Rec Hybrids, Microcircuits and RF/MMIC	2006
USC Distance Ed.	EE573B, (Array) Antenna Analysis, K. Brown, (for credit)	2005
JPL Workshop	How to Handle Difficult People	2004
JPL Workshop	Project Element Manager	2004
JPL Workshop	Ticra GRASP8W Reflector Antenna Analysis	2004
JPL Workshop	Proposing To Win!	2004

Academic Experience:

Over 8 years as a student and 14 years as an educator

Professor	Electrical and Computer Engineering Department, SDSM&T, Rapid City, SD	7/01 – 12/03
Associate Professor	Electrical and Computer Engineering Department, SDSM&T, Rapid City, SD	7/94 – 6/01
Assistant Professor	Electrical and Computer Engineering Department, SDSM&T, Rapid City, SD	1/00 – 6/94
Post-Doctoral Researcher	ElectroScience Laboratory, Ohio State University, Columbus, Ohio	5/89 – 11/89
Graduate Research Assoc.	ElectroScience Laboratory, Ohio State University, Columbus, Ohio	6/83 – 5/89
Rotary Fellow	Ohio State University	9/82 – 5/83
Undergraduate Student	King's College, University of London, London, UK	9/81 – 5/82

Course Repertoire:

Teaching, Electrical and Computer Engineering Dept. South Dakota School of Mines

CENG 241	Real-time Computing (micro-controller interfacing)	Sophomore
EE 312	Signals and Systems (discrete and continuous signals and system, MATLAB)	Junior
EE 322	Electronics II (analog IC-oriented electronics)	Junior
EE 381	Electric and Magnetic Fields (electrostatics and magnetostatics)	Junior
CENG 420	Digital Signal Processing (FFT, digital filters, real-time applications)	Senior
EE 421	Communications Systems (analog and digital communications systems)	Senior
EE 480	Applied Electromagnetics (lines, waves, antennas)	Senior
EE 482	Optical Communications Systems (fiber optic transmission & reception)	Senior
EE / CENG 491 & 492	Senior Design (two-semester hardware / software oriented project)	Senior
EE 621	Information Theory (compaction, compression, error correction)	Graduate
EE 622	Statistical Communication Systems (cellular digital modulation schemes)	Graduate
EE 624	Advanced Digital Signal Processing (wavelets, real-time signal processing)	Graduate
EE 690	High Speed Digital Design (signal integrity, circuits with ultra-fast rise time)	Graduate
EE 781	Electromagnetic Field Theory (Harrington/Balanis, time-harmonic EM)	Graduate

Proficiencies and Signifiant Impacts:

Teaching, SDSM&T ECE

Courses in communications systems, electromagnetics, signal processing, electronics, and design; spanning sophomore to graduate levels

- 165 hours of courses taught between 1990 – 2000 (average of 15 hours year)
- Over 1000 students taught between 1990 – 2000
- Course evaluations average 47% excellent, 35% good: 1990 – 2000
- Consistently assessed as meeting or exceeding expectations in all teaching assignments
- In 2002 (last full year at SDSM&T) advisor to 64 undergraduates and 31 graduate students

Developed new courses in digital signal processing, information theory, and high speed digital design

- Developed realtime signal processing lab, with donations of EZKIT hardware and software (visualDSP) from Analog Devices

Research, SDSM&T ECE

Developed research program in ground penetrating radar (GPR), in collaboration with ChTES Inc.

- Obtained grants worth $650k from NSF and Bureau of Mines
- Created startup company and developed novel beam-steered GPR array concept
- Funded 6 Master's theses
- Numerous follow-on / spin-off projects in beam-steered GPR technology ensued

Established communications engineering as the focus for $1M Miller Chair Endowment

- In collaboration with K. Whites, obtained $2.5M worth of RF equipment and electronic design automation software from HP, Agilent, and NSF (MRI) for the Miller Lab

Research, OSU ESL

Developed novel concept of wideband transient polarization scattering for automated recognition of radar targets

- Recognized as the outstanding ElectroScience Laboratory dissertation of 1989
- Numerous follow-on / spin-off projects ensued, resulting in theses and published papers

Service, SDSM&T ECE

Served on numerous committees, advised numerous organizations, and participated in IEEE-related conferences and student activities

- As chair of the ECE Administrative Committee, developed an ECE staffing plan that was commended by the Dean and Vice President
- Participated in 2 ABET reviews of the ECE program, resulting in successful re-accreditation

Funded Research:

Comuniq Inc.	"Facsimile Group3 Image Decoding Program"	2000
Comuniq Inc.	"General Purpose USB Device"	1999
NSF SBIR Phase I	"Using Hidden Markov Models to Track Human Targets"	1998
REU Supplement	"Electronic Beam Steering for Ground Probing Radar"	1998
EPSCOR SBIR Phase 0	"Novel hybrid modulation approach combining narrow band phase shift keying and wideband spread spectrum techniques"	1998
NSF SBIR Phase II	"Electronic Beam Steering for Ground Probing Radar"	1997

NSF SBIR Phase I	"Enhanced Airborne Beam Steering for Ground Probing Radar"	1996
NSF SBIR Phase I	"Electronic Beam Steering for Ground Probing Radar"	1996
SDSM&T	"Radar Target Identification of Vehicles Using SAR"	1994
Bureau of Mines	"Fixed Array Ground Probing Radar for Ground Monitoring"	1993
General Dynamics	"Development of Radar Target Identification Algorithms"	1989
Grumman	"Low Frequency Radar Detection"	1988
Mitre	"Radar Target Identification of Over-the-Horizon Targets"	1988
Naval research Lab.	"Space-Based Radar Target Identification"	1987
Office of Naval Research	"Radar Target Classification Studies"	1986
Office of Naval Research	"Resonant Structure Non-Cooperative Target Recognition"	1983 – 85
Westinghouse	"Research in Transient Response Scattering of Antennas"	1983

Journal Publications and Conference Publications:

N. Chamberlain & W. Roggenthen	"Field Test Results of a Beam-Steered Ground Penetrating Radar Array", Symposium of Applied Geophysics to Environmental & Engineering Problems	2001
with S. Thompson et al	"Using Hidden Markov Models to Track Human Targets", SPIE International Symposium on Sensor Fusion	1999
N. Chamberlain	"A Beam-Steered Array for Ground Penetrating Radar", 18th Annual Antenna Measurement Techniques Association	1996
N. Chamberlain et al	"An Electronically-Steered Radar Antenna for Ground Probing Applications", Proc. of 11th Annual Workshop on Generic Mineral Technology Center	1993
N. Chamberlain	"Transient Polarization" (invited monograph), Proc. Of NATO Adv Workshop on Direct and Inverse EM Imaging	1992
N. Chamberlain et al	"Radar Target Identification Using Polarization-Diverse Features", IEEE Transaction on Aerospace and Electronics System	1991
N. Chamberlain	"Syntactic Classification of Radar Targets using Polarimetric Signatures", IEEE International Conference Systems Engineering	1990
with D. Strausberger et al	"Modeling and Performance of OTH/HF Radar Target Classification Systems", IEEE International Radar Conference	1990
N. Chamberlain	"Recognition and Analysis of Aircraft Targets by Radar Using Structural Pattern Representations Derived from Polarimetric Signatures", Ph.D. Dissertation	1989
N. Chamberlain et al	"Radar Target Identification of Aircraft Using Time-Domain Polarimetric Signatures", Progress In Electromagnetic Research Symposium	1989
with F. Garber et al	"Time Domain and Frequency Domain Feature Selection For Reliable Target Identification", IEEE National Radar Conference	1988

Theses Supervised:

Ole Gauteplass	"Audio Compression using Wavelets"	2001
Rune Torgersen	"General Purpose USB Device"	2000
Kjetil Berg	"FAX over IP"	2000
Bernt Askildsen	"Auto-Calibration of a Beam-steer Antenna Array"	2000
Manoj Jayakumar	"Antenna Optimization For Ground Penetrating Radar Using The Finite Difference Time Domain Technique"	1999
Matthew Johnson	"Digitally generated minimum shift keying using an FPGA"	1998
Rune Reppenhagen	"Control system for a GPR Antenna Array"	1997
Harold Tjorhom	"Simulation and Testing of a Beam-Steer Array for Ground Penetrating Radar"	1997
Tron Lund	"The Mobile Tracking System"	1997
Hans Fosse	"Study Of A Ground Penetrating Radar System By Finite Difference Time Domain" Simulations Of An Antenna Array"	1997
William Murphy	"A Pulse-Based Radar Antenna Array System"	1994

Other Publications:

N. Chamberlain	"Introduction to Wavelets v1.7", A MATLAB-based tutorial on wavelet signal processing that was written for a graduate-level course on advanced digital signal processing	2002
N. Chamberlain	"Recognition and analysis of aircraft targets by radar, using structural pattern representations derived from polarimetric signatures", Ph.D. dissertation, The Ohio State University ElectroScience Lab	1989
N. Chamberlain	"Ground Vehicle Classification Using Multifrequency Multipolarization Resonance Radar", Technical Report, The Ohio State University ElectroScience Lab	1985
N. Chamberlain	"Surface Ship Classification using Multipolarization Multifrequency Sky-Wave Resonance Radar", Master's Thesis, The Ohio State University ElectroScience Lab	1984

Honors and Awards:

SDSM&T PIF[1]	"For contributions to developing distance education"	2000
Tau Beta Pi	Member	2000
Small Business Admin.	Tibbetts Award "For furthering small business development in South Dakota"	1998
SDSM&T PIF	"For excellence in developing research and teaching"	1998
IEEE Region 5	"First place, design paper competition"	1998
SDSM&T PIF	"For excellent performance"	1997
IEEE Region 5	"For best West Region branch"	1997
IEEE Region 5	"For contributions to IEEE Sections Congress, Denver"	1996
SDSM&T Student IEEE	"For outstanding work and achievements as IEEE faculty advisor"	1995
SDSM&T PIF	"For developed ongoing research and excellence as a teacher"	1994
Eta Kappa Nu	Member	1990
Ohio State ElectroScience Laboratory	"For The Outstanding Dissertation of 1989"	1989
Ohio State University	Rotary International Fellow	1982

Service:

Chair	Black Hills IEEE Subsection	2001 – 2002
Chair	ECE Graduate Committee	1997 –2002
Chair	University Graduate Education and Research Committee	1996 – 1997
Chair	ECE Faculty Searches (2 searches)	1995, 1997
Chair	ECE Administrative Committee	1994 – 1995
Member	ECE Curriculum Committee	1992 – 2002
Member	ECE Faculty Search Committees (5 searches)	1990 – 2002
Member	Rapid City Technology Committee	2000
Member	University North Central Association (NCA) Accreditation Review Committee	2000
Member	ECE ABET Committees	1990, 2000
Member	University Degrees Committee	1993 – 1998
Member	University Faculty Advisory Committee	1994 – 1998
Member	Materials Engineering and Science Committee	1996 – 1997
Member	Dean, College of Systems Engineering Search Committee (2 searches)	1994, 1997
Member	ECE Lab Committee	1995 – 1997
Member	University Freshmen Core Committee	1996
Member	University Committee on Graduate Studies	1993 – 1994
Advisor	SDSM&T IEEE Student Branch	1993 – 2002
Advisor	Tech Mountain Bike Club	1999 – 2002
Advisor	Campus Freethought Society	1999 – 2002
Advisor	Tech Radio Ham Club	1999 – 2002
Advisor	Tech Educational and Research Council (KTEQ FM Radio Station)	2000 – 2002
Participant	IEEE Sections Congress	1997
Participant	IEEE Region 5 Annual Conference and Student Design Competitions	1994 – 2000
Participant	SDSM&T Technical Assistance Conference	1996
Master of Ceremonies	Order of the Engineer Induction Ceremony	1998 – 2002
Coordinator	ECE Exit Examinations	1996 – 2002
Webmaster	ECE Web Pages	2000 – 2002

Continuing Education:

South Dakota School of Mines and Technology

Workshop	"High Speed Digital Design", Boston, MA	1999
Workshop	"Integrating Design Into The Engineering Curriculum", SMU, Texas	1991

Personal:

Citizenship	US (naturalized, dual citizen of UK)
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[1] Program Improvement Fund