
DEPARTMENT SUMMARY

The research program of the Department of Electrical and Computer Engineering (ECE) is very broad, reflecting the variety of skills and interests of the faculty in providing technical advances and solutions to important problems for the Navy and the Department of Defense. In addition to being DoD relevant, research in ECE is strongly coupled to instruction, both in bringing the most recent advances into the classroom and in providing highly relevant and unique thesis topics for officer students to investigate under faculty guidance.

Research in the Department of Electrical and Computer Engineering is supported by an internally funded research program called the NPS Institutionally Funded Research (NIFR) program, and an externally funded research program called the Reimbursable Research (RR) program. The NIFR program includes a Research Initiation Program (RIP) for new faculty and also provides funding for new initiatives, meritorious projects, cost sharing, and a postdoctoral program. The Reimbursable Research program includes those projects that are externally supported by a wide range of government agencies, and by private industry through Cooperative Research and Development Agreements (CRADAs).

In FY 1998, ECE Department reimbursable research totaled \$3.59M. A total of 17.85 faculty research work years were executed, representing 50% of the Department faculty labor. The department's research work led to 14 journal papers, 60 conference papers/presentations, 4 book chapters, and 15 technical reports. These publications are listed following the Research Project Summaries.

Research projects in the department can be grouped into the following specialty areas: Communications; Communication Networks; Computer Engineering; Electromagnetics; Guidance, Navigation, and Control; Infra-Red and Electro-Optics; Microelectronics; Power Electronics, Electrical Machines and Distribution; Radar, Surveillance, and Information Warfare; Signal Processing/Underwater Acoustics; and Signals Intelligence/Space Systems. Following this introduction is a listing of 1998 research project titles and principal investigators, by specialty area. Although some projects span more than one area, they are listed in only one.

Complete Project Summaries appear following the specialty area listing. These Summaries appear in alphabetical order, according to the principal investigator's surname. Publications, presentations, and theses associated with each project are listed. The student thesis involvement in faculty research is evidence of the strong interaction between the department's teaching and research programs.

Communications

THE MILITARY APPLICATION OF MEO AND ICO COMMERCIAL SATELLITE SYSTEMS

Tri T. Ha, Professor

Vicente Garcia, National Security Agency Cryptologic Chair Professor

TIME DOMAIN SIMULATION OF RECEIVING SYSTEMS USING MATLAB/SIMULINK COMMUNICATIONS TOOLBOX

Jovan Lebaric, Visiting Associate Professor

Richard Adler, Research Associate Professor

FAST FREQUENCY-HOPPED DIGITAL COMMUNICATION

R. Clark Robertson, Professor

Communication Networks

NETWORK SIMULATION FOR AAV

Raymond F. Bernstein Jr., Research Associate Professor

ASYNCHRONOUS TRANSFER MODE (ATM) COMPRESSED VIDEO BITSTREAM MODELING AND ANALYSIS FOR INFORMATION WARFARE

John McEachen, Assistant Professor

WIRELESS LOCAL AREA NETWORK (LAN) ANALYSIS

John McEachen, Assistant Professor

DEPARTMENT SUMMARY

INTERNETWORKING ANALYSIS FOR COUNTERNARCOTICS INFORMATION OPERATIONS

John McEachen, Assistant Professor

MODELING AND SIMULATION OF ATM TRANSPORT MECHANISMS IN LARGE-SCALE NETWORKS FOR PROJECTION OF INFORMATION OPERATIONS

John McEachen, Assistant Professor

ORGANIZATIONAL COLLABORATION IN A GLOBALLY NETWORKED ENVIRONMENT

John McEachen, Assistant Professor

TRAFFIC CHARACTERIZATION AND SCHEDULING ISSUES IN MULTIMEDIA WIRELESS NETWORKS

Murali Tummala, Professor

RELOCATABLE REGIONAL SATELLITE-BASED TACTICAL MOBILE TELEPHONE NETWORK

Don Wadsworth, Senior Lecturer

WIRELESS DAMAGE CONTROL COMPUTER NETWORKS

Xiaoping Yun, Associate Professor

Computer Engineering

ADVANCED PROCESSOR AND MEMORY SYSTEMS

Raymond F. Bernstein Jr., Research Associate Professor

DESIGN OF IRREDUNDANT SUM-OF-PRODUCTS CAD TOOLS

Jon T. Butler, Professor

Electromagnetic Systems

SIGNAL-TO-NOISE ENHANCEMENT PROGRAM (SNEP) RESEARCH AND SUPPORT

R. W. Adler, Research Associate Professor

W. R. Vincent, Visiting Research Associate

FIELD STATION RESEARCH AND SUPPORT

R. W. Adler, Research Associate Professor

DEVELOPMENT OF PE MODEL OVER ROUGH SURFACE

R. Janaswamy, Associate Professor

COMPUTER MODELING TECHNIQUES FOR ARRAY ANTENNAS ON COMPLEX STRUCTURES

David C. Jenn, Associate Professor

CIDF REFLECTOR ANTENNA

Jeffrey B. Knorr, Professor

Beny Neta, Professor

MMIC RECEIVER FOR AIR TRAFFIC COLLISION AVOIDANCE

Jeffrey B. Knorr, Professor

ELECTROMAGNETIC CHARACTERIZATION OF METALLIC PLATFORMS VIA EIGEN-FUNCTION ANALYSIS

Jovan Lebaric, Visiting Associate Professor

Richard Adler, Research Associate Professor

DEPARTMENT SUMMARY

HANDS-ON SHORT COURSE ON COMPUTER MODELLING AND SIMULATION IN ELECTROMAGNETICS, COMMUNICATIONS AND RADAR

Jovan Lebaric, Visiting Associate Professor
Robert Vitale, Microwave Lab Director

CLASSIC DIAMONDBACK UNIVERSAL MAST SLEEVE ANTENNA STUDY

Jovan Lebaric, Visiting Associate Professor
Richard Adler, Research Associate Professor

ENHANCED EM RADIATION SOURCE IMAGING

Michael A. Morgan, Professor

IMPULSE ANTENNA MODELING

Michael A. Morgan, Professor

ULTRA-WIDEBAND IMPULSE ANTENNA DESIGN

Michael A. Morgan, Professor
R. Clark Robertson, Professor

WIDEBAND LOW-PROFILE COMMUNICATION ANTENNA DESIGN

Michael A. Morgan, Professor

GEOLOCATION IMPROVEMENTS AT LOW LATITUDES

Rasler W. Smith, Research Assistant Professor
Richard W. Adler, Research Associate Professor
Gus K. Lott, Assistant Professor

Guidance, Navigation, and Control

PHASE ADJUSTMENT CONTROL FOR LORAN-C APPLICATIONS

Murali Tummala, Professor
Roberto Cristi, Associate Professor

ACCURATE CONTROL OF MANIPULATORS USING INERTIAL SENSORS

Xiaoping Yun, Associate Professor

TRACTION CONTROL OF AUTONOMOUS ALL-TERRAIN ROBOTIC VEHICLES

Xiaoping Yun, Associate Professor

Infra-Red and Electro-Optics

PHOTONIC SAMPLING ARCHITECTURES FOR MICROWAVE SIGNAL COLLECTION AND ANALYSIS

John P. Powers, Professor
Phillip E. Pace, Associate Professor

Microelectronics

DESIGN OF A MICROELECTRONIC CONTROLLER AND TACTOR INTERFACE IC FOR THE TACTILE SITUATIONAL AWARENESS SYSTEM

Douglas J. Fouts, Associate Professor

DEPARTMENT SUMMARY

RADIATION TOLERANT BULK CMOS DIGITAL INTEGRATED CIRCUITS

Douglas J. Fouts, Associate Professor

METHODS FOR PERFORMANCE ANALYSIS OF HEAT DISSIPATING STRUCTURES

Ron J. Pieper, Visiting Associate Professor

SEU IMMUNE LOW TEMPERATURE GROWN GaAs INTEGRATED CIRCUITS

Todd Weatherford Assistant Professor

Douglas Fouts Associate Professor

Power Systems

CONVERTER DESIGN, ANALYSIS, AND PROTOTYPE FOR FUTURE NAVY SURFACE SHIPS

Robert William Ashton, Associate Professor

THE SIMULATION AND DSP IMPLEMENTATION OF CLOSED-LOOP ARCP CONTROL ALGORITHMS FOR INVERTER AND BOOST RECTIFIER APPLICATIONS

John G. Ciezki, Assistant Professor

UNINTERRUPTABLE POWER SUPPLY DESIGN FOR THE AN/MRC-142 COMMUNICATION SYSTEM

Sherif Michael, Associate Professor

Radar, Surveillance, and Information Warfare

EVALUATION AND EXTENSIONS OF THE PROBABILISTIC MULTI-HYPOTHESIS TRACKING (PMHT) ALGORITHM TO CLUTTERED ENVIRONMENTS

Robert G. Hutchins, Associate Professor

THEATER BALLISTIC MISSILE DEFENSE (TBMD) – MULTI-SENSOR FUSION, TRACKING, AND TARGETING TECHNIQUES

Robert G. Hutchins, Associate Professor

H.A. Titus, Professor Emeritus

IT-21 VULNERABILITY ASSESSMENT

John McEachen, Assistant Professor

IMPROVEMENT IN ASCM THREAT SIMULATOR MODELING AND SIMULATION TECHNOLOGY

Phillip E. Pace, Associate Professor

DIGITAL TARGET IMAGING ARCHITECTURES

Phillip E. Pace, Associate Professor

EXPERIMENTAL INVESTIGATION OF A HIGH-SPEED HIGH-RESOLUTION DIRECTION FINDING ARRAYS

Phillip E. Pace, Associate Professor

David C. Jenn, Associate Professor

AIRPLATFORM SURVIVABILITY ENHANCEMENT

R. Clark Robertson, Professor

Frederick Levien, Senior Lecturer

DEPARTMENT SUMMARY

LOW-BAND HARM ASSESSMENTS AND EVALUATIONS – PHASE ONE

Lonnie A. Wilson, Research Associate Professor

ECONOMICAL SAR/ISAR SYSTEM DEVELOPMENT FOR UAV APPLICATIONS – PHASE ONE

Lonnie A. Wilson, Research Associate Professor

Signal Processing/Underwater Acoustics

SIGNAL CLASSIFICATION ISSUES USING WAVELET-BASED FEATURES

Monique P. Fargues, Associate Professor

FEATURE EXTRACTION FOR SIGNAL CHARACTERIZATION IN CLASSIFICATION APPLICATIONS

Monique P. Fargues, Associate Professor

TIME DIFFERENCE OF ARRIVAL ESTIMATION BASED ON WAVELET SCALES

Ralph D. Hippenstiel, Associate Professor

Tri T. Ha, Professor

PROCESSING OF RADAR SIGNALS USING CORRELATION AND WAVELET CONCEPTS

Ralph D. Hippenstiel, Associate Professor

Monique P. Fargues, Associate Professor

PROCESSING OF SECOND ORDER STATISTICS VIA WAVELET TRANSFORMS

Ralph D. Hippenstiel, Associate Professor

Monique P. Fargues, Associate Professor

BEARTRAP POST-MISSION ANALYSIS SYSTEM

Murali Tummala, Professor

Charles W. Therrien, Professor

MULTI-SENSOR DATA FUSION FOR THE VESSEL TRAFFIC SERVICES SYSTEM

Murali Tummala, Professor

Signals Intelligence/Space Systems

PROJECT GUSTY ORIOLE

H. H. Loomis, Jr., Professor

RADIATION HARDENED SPACE BASED SOLAR CELLS AND ELECTRONIC DEVICES

Sherif Michael, Associate Professor

TIME RESOLVED SINGLE EVENT EFFECT STUDIES IN SOI

Todd Weatherford, Assistant Professor

RADIATION HARDNESS ANALYSIS OF InP AND SiGe TECHNOLOGIES FOR SPACE APPLICATIONS

Todd Weatherford, Assistant Professor

DEPARTMENT SUMMARY

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Naval Postgraduate School
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