
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. DoD 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 with faculty guidance.

Research in the Department of Electrical and Computer Engineering is supported by an internally funded research program called the Direct Funded Research (DFR) Program, and an externally funded research program called the Reimbursable Research (RR) program. The DFR 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 which are externally supported by a wide range of government agencies, and by private industry through Cooperative Research and Development Agreements (CRADAs).

In FY 1997, ECE Department reimbursable research totaled \$3.05M. A total of 16.3 faculty research work years were executed, representing 46% of the Department faculty labor. The Reimbursable Program supported 12.6 faculty work years, or 77% of the total research effort. The department's research work led to 18 journal papers, 61 conference papers, 1 book, 1 book chapter, 23 technical reports, and 1 patent. These publications are listed following the Research Project Summaries.

Research projects in the department can be grouped into the following specialty areas: Communications; Computer Engineering; Electromagnetics; Power Electronics, Electric Machines and Distribution; Infra-red and Electro-optics; Radar, Surveillance, and Information Warfare; Signal Processing/Underwater Acoustics; Guidance, Navigation, and Control; Microelectronics; and Signals Intelligence/Space Systems. Following this introduction is a listing of 1997 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 these 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

RADIO FREQUENCY (RF) MESH NETWORKING AND POWER MANAGEMENT

Chin-Hwa Lee, Professor

A HIGH DATA RATE COFDM MODEM FOR UHF LINE-OF-SIGHT COMMUNICATIONS IN A MARITIME ENVIRONMENT

Paul H. Moose, Associate Professor

OPNET SIMULATION OF A MACRO-CELL WIRELESS NETWORK

Murali Tummala, Professor

Computer Engineering

MULTIPLE-VALUED COMPUTER LOGIC CIRCUITS

Jon T. Butler, Professor

REDUNDANT NUMBER SYSTEMS

Jon T. Butler, Professor

READ PREDICTION CACHE MEMORIES FOR EMBEDDED MICROPROCESSOR SYSTEMS

Douglas J. Fouts, Associate Professor

DEPARTMENT SUMMARY

PROJECT GUSTY ORIOLE, COMPUTE ALGORITHMS AND ARCHITECTURES FOR SPACE APPLICATIONS
Herschel H. Loomis, Professor

ORGANIZATIONAL COLLABORATION IN A GLOBALLY NETWORKED ENVIRONMENT
John McEachen, Assistant Professor

WIRELESS DAMAGE CONTROL COMPUTER NETWORK
Xiaoping Yun, Associate Professor

Electromagnetic Systems

SIGNAL-TO-NOISE ENHANCEMENT PROGRAM (SNEP) RESEARCH AND SUPPORT
R.W. Adler, Research Associate Professor
W.R. Vincent, Visiting Research Associate

ENHANCEMENTS FOR THE RADIO FREQUENCY (RF) MISSION PLANNER
R.W. Adler, Research Associate Professor

SYSTEM MODELING AND ANALYSIS CENTER SUPPORT FOR ANTENNA PERFORMANCE EVALUATION
R.W. Adler, Research Associate Professor

FIELD STATION RESEARCH AND SUPPORT
R.W. Adler, Research Associate Professor

PROPAGATION PREDICTION TECHNIQUES OVER ROUGH OCEAN AND UNEVEN TERRAIN
R. Janaswamy, Associate Professor

COMPUTER MODELING TECHNIQUES FOR ARRAY ANTENNAS ON COMPLEX STRUCTURES
David C. Jenn, Associate Professor

LOW-COST FINLINE FILTER CONSTRUCTION METHOD
Jeffrey B. Knorr, Professor

EA6-B ANTENNA DESIGN AND EVALUATION SUPPORT
Jovan Lebaric, Visiting Associate Professor
Richard Adler, Research Associate Professor

ELECTROMAGNETIC CHARACTERIZATION OF METALLIC PLATFORMS VIA EIGEN-FUNCTION ANALYSIS
Jovan Lebaric, Visiting Associate Professor
Richard Adler, Research Associate Professor

ELECTROMAGNETIC (EM) SCATTERING FROM A TUBULAR CYLINDER OF ANISOTROPIC SURFACE IMPEDANCES
H.-M. Lee, Associate Professor

ELECTROMAGNETIC (EM) SIGNATURE SOURCE MEASUREMENT USING SPATIAL SPECTRAL DOMAIN PROCESSING
Michael A. Morgan, Professor

IMPULSE ANTENNA MODELING
Michael A. Morgan, Professor

DEPARTMENT SUMMARY

ULTRA-WIDEBAND IMPULSE ANTENNA DESIGN

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

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

Phillip E. Pace, Associate Professor
David C. Jenn, Associate Professor

Power Systems

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

Robert W. Ashton, Assistant Professor

THE DEVELOPMENT OF AUXILIARY RESONANT COMMUTATED POLE (ARCP) BOOST RECTIFIER CONTROLS, AND THE CONSTRUCTION AND VALIDATION OF A SOFT-SWITCHED DC-TO-DC CONVERTER

Robert W. Ashton, Assistant Professor

POWER ELECTRONIC BUILDING BLOCK (PEBB) NETWORK SIMULATION TESTBED VALIDATION AND THE DEVELOPMENT OF A PEBB UNIVERSAL LIBRARY

John G. Ciezki, Assistant Professor

INTERACTIONS AND DYNAMICS OF POWER ELECTRONIC BUILDING BLOCK NETWORK CONTROLLERS

John G. Ciezki, Assistant Professor

Signal Processing/Underwater Acoustics

SIGNAL DENOISING USING WAVELET THRESHOLDING TECHNIQUES

Monique P. Fargues, Associate Professor

ECONOMIC EVALUATION OF VOICE RECOGNITION FOR THE CLINICIAN'S DESKTOP AT THE NAVAL HOSPITAL ROOSEVELT ROADS (NHRR)

Monique P. Fargues, Associate Professor

PROCESSING OF SECOND ORDER STATISTICS VIA WAVELET TRANSFORMS

Ralph D. Hippenstiel, Associate Professor

SUPPORT OF THE NEAR SHORE TACTICAL RECONNAISSANCE (NSTR) PROGRAM

Lawrence J. Ziomek, Professor

MATHEMATICAL MODELING OF DOLPHIN BIOSONAR

Lawrence J. Ziomek, professor

Microelectronics

RADIATION TOLERANT BULK CMOS DIGITAL INTEGRATED CIRCUITS

Douglas J. Fouts, Associate Professor

DYNAMIC LOGIC CIRCUITS FOR COMPLEMENTARY GALLIUM FABRICATION PROCESSES

Douglas J. Fouts, Associate Professor

DEPARTMENT SUMMARY

SEU IMMUNE LOW TEMPERATURE GROWN GaAs INTEGRATED CIRCUITS

Todd Weatherford, Assistant Professor
Douglas Fouts, Associate Professor

HIGH PERFORMANCE, RADIATION HARDENED INTEGRATED CIRCUIT (IC) TECHNOLOGIES

Todd Weatherford, Assistant Professor

Infra-red and Electro-optics

LOW ALTITUDE INFRARED (IR) PROPAGATION ABOVE OCEAN

H.-M. Lee, Associate Professor

DEVELOPMENT OF MOSAIC INFRA-RED MODELING SYSTEM AND UWB HIGH POWER MICROWAVE JAMMER

Fred Levien, Senior Lecturer
R. Clark Robertson, Professor

OPTICAL SAMPLING OF MICROWAVE SIGNALS

Phillip E. Pace
John Powers, Professor

Radar, Surveillance, and Information Warfare

MISSILE CLOSURE SIMULATION AND ANALYSIS TO SUPPORT TESTING MISSILE APPROACH WARNING SYSTEMS

Robert G. Hutchins, Associate Professor

EVALUATION AND EXTENTIONS OF THE PROBABILISTIC MULTI-HYPOTHESIS TRACKING ALGORITHM TO CLUTTERED ENVIRONMENTS

Robert G. Hutchins, Associate Professor

THEATER BALLISTIC MISSILE DEFENSE-MULTI-SENSOR FUSION, TRACKING AND TARGETING TECHNIQUES

Robert G. Hutchins, Associate Professor

SURVEILLANCE SYSTEM STUDIES

Jeffrey B. Knorr, Professor

DD963 ANTENNA DATA ANALYSIS

Jeffrey B. Knorr, Professor

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

Jovan Lebaric, Visiting Associate Professor

ADVANCED PHASED ARRAY ANTENNA TECHNOLOGIES

Chin-Hwa Lee, Professor

RADAR TERRAIN MASKING ALGORITHM EVALUATION OF TAMPS, AFMSS, AND IMOM

Fred Levien, Senior Lecturer

DEPARTMENT SUMMARY

INFORMATION OPERATIONS RESEARCH SUPPORT

Gus K. Lott, Assistant Professor

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

John McEachen, Assistant Professor

DEFENSIVE ASYNCHRONOUS TRANSFER MODE (ATM) MODELING AND ANALYSIS FOR INFORMATION WARFARE

John McEachen, Assistant Professor

INTERNET WORKING ANALYSIS FOR COUNTERNARCOTICS INFORMATION OPERATIONS

John McEachen, Assistant Professor

MODELING AND SIMULATION OF ASYNCHRONOUS TRANSFER MODE (ATM) TRANSPORT MECHANISMS IN LARGE-SCALE NETWORKS FOR PROJECTION OF INFORMATION OPERATIONS

John McEachen, Assistant Professor

IMPROVEMENT IN ANTI-SHIP CRUISE MISSILE (ACSM) THREAT SIMULATOR MODELING AND SIMULATION TECHNOLOGY

Phillip E. Pace, Associate Professor

MEASURES OF EFFECTIVENESS — REDUCED RF SIGNATURES VS. EW COUNTERMEASURES

R. Clark Robertson, Professor

MEASURES OF EFFECTIVENESS — REDUCED IR SIGNATURES VS. IR COUNTERMEASURES

R. Clark Robertson, Professor

EVALUATION OF MOSAIC AND GTSIMS FOR MODELING AND SIMULATION OF IR TACTICAL SCENARIOS

R. Clark Robertson, Professor

IR-TALD

R. Clark Robertson, Professor

MULTI-TARGE/MULTI-SENSOR FUSION PROCESSING TECHNIQUES

Harold Titus, Professor

BEARTRAP POST-MISSION ANALYSIS SYSTEM

Murali Tummala, Professor

Charles W. Therrien, Professor

PREDISTORTION TECHNIQUES FOR HIGH POWER AMPLIFIERS

Murali Tummala, Professor

DATA FUSION ALGORITHMS FOR VESSEL TRAFFIC SYSTEM

Murali Tummala, Professor

Guidance, Navigation, and Control

LORAN-C: CALOC TIME DIFFERENCE ERROR CONTROL

Murali Tummala, Professor

DEPARTMENT SUMMARY

COORDINATION OF MOBILE MANIPULATORS

Xiaoping Yun, Associate Professor

FEATURE-BASED LOCALIZATION AND NAVIGATION OF AUTONOMOUS MOBILE ROBOTS

Xiaoping Yun, Associate Professor

AN INTEGRATED INS/GPS SHALLOW-WATER AUV NAVIGATION SYSTEM

Xiaoping Yun, Associate Professor

RESEARCH ON A SEMI-AUTONOMOUS GROUND AND AERIAL VEHICLE SYSTEM FOR MINE/UNEXPLORED ORDNANCE (UXO) DETECTION AND CLEARING

Xiaoping Yun, Associate Professor

Signals Intelligence/Space Systems

MILITARIZATION OF COMMERCIAL LOW EARTH ORBIT SATELLITE SYSTEMS (LEOS)

Tri T. Ha, Professor

Microelectronics

RADIATION HARDENED SPACE BASED SOLAR CELLS & ELECTRONIC DEVICES

Sherif Michael, Associate Professor

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

Sherif Michael, Associate Professor

SEU IMMUNE LOW TEMPERATURE GROWN GaAs INTEGRATED CIRCUITS

Todd Weatherford, Assistant Professor

Douglas Fouts, Associate Professor

HIGH PERFORMANCE, RADIATION HARDENED INTEGRATED CIRCUIT (IC) TECHNOLOGIES

Todd Weatherford, Assistant Professor

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