Department of Engineering Annual Report


I. Past Year Activity

A. Progress in Meeting Annual Goals.

Progress in 2011-12 on goals set in previous year

Referring to goals and future plans listed by the department in last year’s annual report, report on progress made in accomplishing these items.

<table>
<thead>
<tr>
<th>Goals Set in 2010-11 Report</th>
<th>Progress in 2011-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move equipment into 4200 SF laboratory building</td>
<td>Building close to completion, anticipating move in Fall 2012</td>
</tr>
<tr>
<td>Purchase, set up and test wind tunnel</td>
<td>Purchased wind tunnel and tested. The wind tunnel instrumentation, support and test section will have to be modified to comply with research requirements</td>
</tr>
<tr>
<td>Organize and conduct Solid Propellant Rocket workshop in August 2010 for “Go for Aerospace” program</td>
<td>accomplished</td>
</tr>
<tr>
<td>Organize and conduct national helicopter workshop for June 16-22, 2011</td>
<td>accomplished</td>
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<table>
<thead>
<tr>
<th>Goals Set in 2012-13 Report</th>
<th>Progress in 2012-13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move equipment into 4200 SF laboratory building</td>
<td>Building close to completion, anticipating move in Summer and Fall 2013</td>
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<tr>
<td>Organize and conduct national helicopter workshop for June 17-23, 2012</td>
<td>accomplished and was on channel 3 News</td>
</tr>
<tr>
<td>Participation in Civil Engineering national accreditation</td>
<td>accomplished</td>
</tr>
<tr>
<td>program</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>---</td>
</tr>
<tr>
<td>Wind tunnel instrumentation, support and test section modifications to comply with research requirements</td>
<td>No accomplished due to building construction</td>
</tr>
</tbody>
</table>
B. Progress with Strategic Planning.

C. Administrative Changes.

P. Baumann was elected as department chairperson

D. Special Initiatives.

E. Significant Accomplishments.

- Civil Engineering EAC of ABET accreditation

Contributions to Undergraduate and Graduate Research

1. Engineering Professors Viatcheslav Naoumov and Nidal Al-Masoud continued to work with engineering students – members of Lunar Exploration Club on the redesign and improvement of CCSU NASA Moonbuggy vehicle. Moonbuggy team of the CCSU engineering students participated in the 20th NASA Great Moonbuggy Race of 2013 that took place on April 13th - 14th in NASA Marshall Space Center, Huntsville AL. CCSU team was 6th in the race and design competition out of 44 universities from USA, Canada, India, Germany, Russia, Arabian Emirates and Puerto Rico.

2. Professor Viatcheslav Naoumov and engineering students team continued their research on the combustion of non-conventional fuels in Hybrid Propellant Rocket Engine (HPRE). A Small-scale HPRE, test fixture and instrumentation system have been designed, manufactured and assembled. First tests were successfully performed which were focused on the combustion of paraffin and oxygen. Research results were presented and published in the paper co-authored with ME students in the proceedings of 50th AIAA Meeting and Exhibit: Naoumov V., Haralambous A., Goldreich A., “Hybrid Propellant Rocket Engine Test Fixture and Research on the Combustion of Non-Conventional Fuels”. AIAA Paper 2013-0450, 51st Aerospace Science Meeting and Exhibit. Dallas/FtWorth Region, TX, January 7-10 2013, 15p.

3. In 2011-2012, a total of 56 students of the engineering programs were involved in course related research. (This is the sum of all capstone course enrollments and 5 3-credit independent studies of which I’m aware. Also, list any that are not course related, maybe club related.)

Grants

1. V. Naoumov, CSU AAUP 2012/13 Research Grant ($5,000) “RESEARCH ON THE COMBUSTION OF NON-CONVENTIONAL AND BIO-DERIVED FUELS IN HYBRID PROPELLANT ROCK ENGINE: PHASE-II”.

2. V. Naoumov, CCSU 2012/13 Faculty-Student Research Grant ($840) V. Naoumov. “Investigation of the Combustion of Paraffin and Research on the Combustion of Bee’s Wax in the Hybrid Propellant Rocket Engine – Stage III”.

3. V. Naoumov, CCSU 2012/13 Faculty Development Grant “Presentation of Two Research Papers at the 51st QAIAA Aerospace Science Meeting Including New Horizons Forum and Aerospace Exposition.” ($1,500).
4. V. Naoumov, Grant from SET, ($4,000) “Moonbuggy Vehicle - 3 Design and Fabrication” (2012/13)
5. V. Naoumov, Grant from SET, ($2,000) “Hybrid Propellant Rocket Engine - Paraffin and Bee’s Wax”, (2012/13)
6. V. Naoumov, CCSU Foundation, ($3,145) “CCSU Foundation gift in support of the SET for the benefit of the Moonbuggy and HPRE Projects”.
7. V. Naoumov, CSU AAUP 2013/14 Research Grant ($4,000) “EXPERIMENTAL AND THEORETICAL RESEARCH ON THE COMBUSTION OF BIO-DERIVED FUELS WITH ADDITIVES IN HYBRID PROPELLANT ROCKET ENGINE: PHASE-III”, PI.
8. L. Amaya-Bower, AAUP Research Grant $3700 grant aims to investigate the dynamic behavior of multiphase flows in micro-channel devices. This is a numerical investigation, which will utilize ANSYS-Fluent.
9. L. Amaya-Bower, $7,500 grant is a Curriculum Development awarded to be used in the Development of an Undergraduate Level Course for Engineering Analysis and Graduate Level Course for Computational Fluid Dynamics.
10. A. Gates, $48,000 NASA Space Grant College Consortium, Summer Helicopter and UAS Program, June 16-21, 2013
11. T. Vasko, Federal Aviation Administration (FAA) Grant Award: “Non-Linear Finite Element Modeling Guidelines for Aerospace Impact Applications”; $60,000.00

G. Assessment. See appendix

II. Planning for 2013-2014

A. Goals.

Goals for 2013-14

- Move equipment into 4200 SF laboratory building.
- Organize and conduct national helicopter work shop for June 16-21, 2013
- Wind tunnel instrumentation, support and test section modifications to comply with research requirements
- Purchase and installation of airflow sensors for the wind tunnel
B. Collaboration.

C. Needs.

C.1 Equipment Budget Increase of 75%: The equipment and material budget has remained constant for a number of years. During the years the number of students and faculty have increased substantially compared with other departments. The increase in our budget will provide funding to maintain our engineering manufacturing and testing equipment. In addition the increased budget will provide funding for raw materials necessary to manufacture equipment for research and student team projects such as, moonbuggy, FSAE formula race car, unmanned aerial systems aircraft, helicopter research test fixture, and will aid in the student faculty research. This funding increase is also necessary to provide CCSU with the visibility to be considered as one of the top engineering schools in New England.

C.2 Faculty Line Increase of Six: During the Fall 2012 Spring 2013 semesters the department of engineering received two faculty lines which were removed from the department during the Spring 2013 semester. These lines are critical to reduce the current and future faculty loads. If the faculty line are not provided the engineering faculty will continue to be over loaded. In addition the department of engineering developed a technical writing course ENGR 290 which is now has become part of most programs within the School of Engineering and Technology. This will require two additional faculty lines, when the course is fully implemented in the programs. It is recommended that the administration shift faculty lines from another school where there has been a decline in course enrolment. Two additional faculty lines are requested to allow for new program development and expansion of existing programs.

C.3 Increase travel budget by 150%: The engineering department faculty are having difficulty affording to present technical papers, attend national and international meetings and software and equipment training workshops. The field of engineering and technology is changing at rapid rate and the faculty are having difficulty staying current because there are not sufficient funds to attend technical workshops on new engineering software, experimentation equipment and new testing equipment. For the past several years the department was required to use the departmental funds to pay for travel and some faculty did not travel or present at conferences which is a requirement for promotion and tenure. Also the faculty are making every effort to seek funding outside of CCSU to pay for the conference presentation and workshops.

Section 1 Mission and Programs

Department Mission

The mission of the Engineering Department is to prepare graduates for employment in the technical field which requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities. Engineering technologists work in many functional and responsive ways to execute the applications supporting the industry. The Engineering Department, in accordance with the University, believes that professional education includes a careful balance between liberal arts and professional studies to enable the students to develop the knowledge and competencies necessary for continual growth and to acquire the skills, breath and openness required for independent learning in a dynamic society of rapid change and increasing challenge.

Degree Programs

- Civil Engineering (BS)
- Civil Engineering Technology (BS)
- Manufacturing Engineering Technology (BS)
- Mechanical Engineering (BS)
- Mechanical Engineering Technology (BS)
- Engineering Technology (MS)

Section 2

Program Summary for Civil Engineering (BS)

Program Coordinator: Dr. C. Anderson

Program Rationale or Mission

The mission of the civil engineering program is to provide students with a broad and thorough education in civil engineering fundamentals, applications, and design that prepares them for the practice of civil engineering at the professional level with the confidence and skills necessary to meet the technical and social challenges of the future. The program provides a broad and thorough education in mathematics, physics, chemistry, engineering mechanics, and civil engineering, coupled with application of modern engineering tools. Graduates will attain the skills for entry-level civil engineering positions leading to professional engineering registration, and will have a solid undergraduate foundation in general civil engineering principles, enabling continued education at advanced levels.

Program Summary for Civil Engineering Technology (BS)

Program Coordinator: Dr. C. Anderson
Program Summary for Manufacturing Engineering Technology (BS)
Program Coordinator: Dr. Zbigniew Prusak

Program Rationale or Mission
The Manufacturing Engineering Technology Degree Program prepares graduates for professional careers as engineering technologists. The student shall acquire knowledge in mathematics, physical sciences, mechanics, manufacturing processes, materials, design, programming, engineering standards, production planning, project planning and supervision, cost analysis and quality control. The manufacturing program provides relevant industrial experience within the academic environment to apply theoretical and practical concepts to improve manufacturing processes and mechanical or manufacturing components. The students shall develop writing and communication skills and engineering problem-solving skills and be able to apply these skills to the design, testing and manufacture of a wide variety of components. The program also provides relevant industrial experience via co-op education.
Program Summary for Mechanical Engineering (BS)

State of the Mechanical Engineering Program (BS)

Program Coordinator: Dr. Nidal Al-Masoud

Accreditation

The mechanical engineering program received its initial accreditation by the Engineering Accreditation Commission (EAC) of the Accreditation Board of Engineering and Technology, Inc. (ABET). ABET is nationally and internationally recognized accreditation agency, our program was granted accreditation effective 2008, allowing all our graduates to be considered graduates of an accredited program. Achieving this goal is an important milestone and a reflection of the quality of our young program and its ability to compete with well-established existing programs in the region. Besides strong analytical and design skills and the ability to keep up with the fast pace of the technological changes, our program prepares students to recognize and value attributes like practical ingenuity, creativity, leadership, professionalism, and lifelong learning. These attributes are an integral part of any engineering profession.

The Department has submitted an interim report addressing two weaknesses cited by ABET, the draft statement from ABET to our interim report was favorable and stated that both weaknesses were resolved to the satisfaction of the evaluation team chair. The final statement will be issued July or August 2010.

Program Rationale or Mission

The mission of the mechanical engineering program is to provide and sustain a quality, state-of-the-art education in mechanical engineering that enables students to develop specialized knowledge and experience required to practice as professional mechanical engineers or to pursue a course of analytical study. The program offers prospective engineering students the opportunity to explore an engineering field by providing basic core and advanced engineering courses.

Mechanical Engineering Program Educational Objectives (POEs)

Guided by the Mission of the University, the Mechanical Engineering program is committed to preparing students who will be thoughtful, responsible, and successful citizens. Based on the Accreditation Agency final statement, the PEOs were formulated with input from the faculty, students, alumni, administration and Industrial Advisory Board (IAB). Feedback was solicited from the aforementioned constituencies, and necessary changes were implemented.

The Mechanical Engineering program seeks to prepare graduates who, after the first few years of their career, have:

2) Established themselves as valued practicing mechanical engineers working primarily in the region.

3) Become supportive members of the community and active professionally, seeking continuous improvement of skills and professional growth.
Student Learning Outcomes

1. ability to apply the knowledge of mathematics, science and engineering principles to solve mechanical engineering problems.
2. ability to design and conduct experiments, and to analyze and interpret data.
3. ability to design a system, component or process to meet desired needs with respect to function and manufacturability, as well as to economic, ethical, environmental and sustainability, health and safety, social and political constraints.
4. ability to function effectively on multi-disciplinary teams and within a diverse environment.
5. ability to identify, formulate and solve engineering problems.
6. understanding of professionalism, ethics and associated responsibilities.
7. ability to communicate effectively in oral, written, visual and graphic modes.
8. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. Recognition of the need for self-improvement through continuing education and the ability to engage in lifelong learning.
10. a knowledge of contemporary issues
11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

ME1. an ability to apply advanced mathematics through multivariate calculus and differential equations.
ME2. an ability to use probability theory, statistics and linear algebra to formulate and solve engineering problems.
ME3. An ability to design, to analyze, and to optimize thermal and mechanical systems.

Significant Curricular Changes

Students’ Strengths and Weaknesses /Adjustments Made Based on Assessment Findings
Program Summary for Mechanical Engineering Technology (BS)
Program Coordinator: Dr. Peter Baumann
Program Rationale or Mission
The Mechanical Engineering Technology Degree Program prepares students with the ability to apply theoretical and practical concepts towards professional careers which make significant contributions in supporting engineering design, testing, production, and research and development activities for advanced mechanical systems in a wide variety of industrial, aerospace, and government organizations. The major provides required knowledge and develops necessary problem solving skills through studies in mathematics, physical sciences, mechanics, manufacturing processes, engineering materials, fluids, thermodynamics, electrical circuits, and computer-aided engineering graphics and mechanical design. The Mechanical Engineering Technology Program provides relevant industrial experience within the academic environment through laboratory projects, experimentation, classroom lecture and demonstrations.

Learning Outcomes
1) Ability to apply basics knowledge of mathematics, science and engineering principles to solve technical problems.
2) Ability to identify, formulate and solve technical problems.
3) Ability to use computational methods, skills, computers and modern technical tools in engineering practice.
4) Ability to design and conduct experiments, and to analyze and interpret data.
5) Ability to design a system, component or process to meet desired needs.
6) Ability to function effectively on teams and within a diverse environment.
7) Ability to communicate effectively in oral, written, visual and graphic modes.
8) Recognition of the need for self-improvement through continuing education and the ability to engage in lifelong learning.
9) Understanding of professionalism and ethics and associated responsibilities.
10) Knowledge of contemporary issues and understanding of the impact of engineering / technical solutions within a global perspective.

Significant Curricular Changes
No significant curricular changes.

Students’ Strengths and Weaknesses / Adjustments Made Based on Assessment Findings
The Industrial Advisory Board concluded that the 2011-2012 assessment data and evaluation based on a rating scale 1-4 is very positive indicating a strong program. The curriculum and course content continues to fulfill all the program objectives (1-4) and learning outcomes (1-10), by preparing students and graduates with the skills necessary for employment and successful careers in the discipline. Based on findings, a local exam for assessing analytical abilities that counts for grading was used in ET 357 and found to have been successful in improving student analytical performance that is assessed.
Program Summary for Engineering Technology (MS)
Assessment Engineering Technology (MS)

Program Coordinator: Dr. A. Gates

Program Rationale or Mission
The Master of Science in Engineering Technology graduate program offers two specializations-Civil/Construction and Mechanical/Manufacturing. The Master of Science in Engineering Technology with a specialization in Civil/Construction Engineering Technology is designed for the working professional to continue his or her education at night at CCSU. The program will extend the knowledge of students into areas of established and emerging technologies in Architecture/Engineering/Construction (ACE) industries, including the study of Geographical Information Systems (GIS), Global Positioning Systems (GPS), site development, urban hydrology, construction engineering, administration, and infrastructure rehabilitation and management.

The Masters of Science in Engineering Technology with a specialization in Manufacturing/Mechanical Engineering Technology provides students with academic experience in applied engineering methods in the areas of mechanical and manufacturing. Specialization areas focus on advanced materials, manufacturing, and technical management. Technical electives include mechanical design and analysis, manufacturing methods, materials, quality control, and applied engineering management. The program is designed to provide applied engineering methods to aid graduates and engineering’s in remaining current with technology, improve productivity, and assist with advancement into leadership positions in industry.

Learning Outcomes

Civil/Construction
1) Apply basic knowledge of mathematics science and engineering principles to solve technical problems;
2) Identify, formulate and solve technical problems;
3) Use computational methods, skills, computers and modern technical tools in engineering practice;
4) Design and conduct experiments, and to analyze and interpret data;
5) Execute a project to meet desired needs; and.
6) Communicate effectively in oral and written, visual and graphic modes.

Mechanical/Manufacturing
1) Ability to use computational methods, skills, computers and modern technical tools in engineering practice.
2) Ability to identify, formulate and solve technical problems.
3) Ability to design and conduct experiments, and to analyze and interpret data.
4) Ability to design a system, component or process to meet desired needs.
5) Knowledge of contemporary issues and understanding the impact of engineering/technical solutions within a global perspective.
6) Ability to communicate effectively in oral, written, visual and graphical modes.
Significant Curricular Changes
None

Section 3 Summary of Faculty Accomplishments

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<th>Creative activity</th>
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<th>2012-2013</th>
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<td>External grant funding proposals</td>
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See appendix for faculty accomplishments
Funding Proposals


Workforce Development

SE&T Career Services - Fall 2012 & Spring 2013 Activities
Career Services within the School of Engineering and Technology (SE&T) is flourishing. The past year was full of activities including resume reviews, interview preparation, visits from employers, targeted career fairs and hundreds of job postings on the website.

Resume & Interviewing Preparation
Diane Hunter, Career Services Coordinator, has been busy assisting students with resume writing and interviewing preparation. She has updated and improved the resume writing and interviewing guidelines. She provides resume proofreading and has conferences with students to ensure students’ resumes are as powerful as possible. Mrs. Hunter has also met with students to fully prepare them for the interview process, including performing mock interviews.

Industry Contacts, Job Postings and Website
Mrs. Hunter manages the Career Services section of the SE&T Website. The website includes career advice as well as job postings for permanent employment, co-operative employment, and internship positions. She has increased her contact list to well over 375 companies within the local industry in the areas of Engineering, Construction Management, Information Technology and other technology areas. This has led to over 200 job postings over the past year. The job postings provide a direct link to the employers so students can apply on their own. During the semester, new postings come in on a daily basis.

Co-operative Education Program
Mrs. Hunter gets involved with collecting resumes and setting up on-campus interviews for the co-op positions that need to be more carefully monitored. She also works with the Center for Advising and Career Exploration (CACE) to ensure students follow the proper procedure for co-op positions. Mrs. Hunter works closely with Joe Zeoli of CACE to ensure that students are aware of all the co-op opportunities that exist within CCSU.

SE&T Career Fairs
The Engineering and Manufacturing and Construction Management Departments at CCSU hosted a fall semester Engineering and Manufacturing Career Fair on Wednesday, November 7, 2012. Due to an unexpected snow storm, there were only about 17 employers who participated and approximately 100 students in attendance. Originally there were 53 employers and 200 students scheduled to attend. Companies in attendance included Sikorsky Aircraft, Pratt & Whitney, General Dynamics, and Turner Construction. There were also several other local mechanical, manufacturing and civil engineering firms represented. Students were able to talk with company representatives first hand to learn about job openings for internships, co-ops and permanent employment.

The event was organized by Mrs. Hunter. Participating companies were provided with display tables and copies of students’ resumes. Students were provided in advance with company names
and website links to prepare for the event. Students were well prepared, well dressed and made a great impression upon the company representatives.

On Thursday, March 21, 2013 Mrs. Hunter also coordinated a spring Engineering, Manufacturing and Construction Management Career Fair. The spring fair attracted 65 employers and had around 200 students in attendance. About half of the employers were in the Mechanical and Manufacturing areas and half in the Civil Engineering and Construction Management areas. Companies in attendance included the Connecticut Department of Transportation, Tilcon, UTC Aerospace Systems, Whelen Engineering, and Barnes Aerospace. Much positive feedback was received from employers, students and faculty.

Data Collection
Mrs. Hunter finishes each semester with organizing files of student resumes, updating the industry contacts spreadsheet, recording activity logs and collecting statistical data on student employment as best as possible.

Community engagement
- Dr. Baumann is a Director, Board of Southern Connecticut Chapter of ASM, International, 2003-present.

- Alfred A. Gates Director of a NASA Sponsored helicopter work shop June 17-24, 2012. 25 Graduate and under graduate students attended CCSU and University of Hartford for a week long intensive program on principles of helicopter flight, low speed rotor blade aerodynamics, helicopter wind tunnel testing methods, introduction to unmanned aerial vehicles and vertical take of and landing aircraft. Funded by NASA Connecticut Space Grant.

- T. Vasko, MathCounts Participation - MathCounts is a national completion sponsored by the National Society of Professional Engineers to encourage the study of math in 7th and 8th grade students and to introduce students to engineering careers
  - Hartford Chapter Competition – February 13, 2012
  - Connecticut State Competition – March 13, 2012
Appendix: Faculty Accomplishments
Nidal Al-Masoud, Ph.D.
L. Amaya-Bower

Past Year Activity

Services to the department

As part of the service I provide to the department I am member of the following committees:

Search Committees

I was member of a search committee for a manufacturing engineering position (C13-020). As part of these committees, I was able to evaluate the qualifications of all the candidates, and discern those who could move to the next step in the evaluation process.

Prereq Committee

This committee’s goal is to improve the academic performance of student in core curriculum classes by evaluating and modifying the prerequisites of these classes.

Service to the school

Parking Appeals Committee

As a member of this committee, I review appeals for parking violations. Evaluation of these appeals is done using CCSU Parking Policies and Regulations.

Grants and professional development

I was given two grants. One from the Connecticut Space Grant College Consortium and one from AAUP. The first grant will be used to develop the curriculum of two classes in numerical methods and computational fluid mechanics. The second is a research grant, which aims to investigate the dynamic behavior of multiphase flows in micro-channel devices.

Future Activity

Services to the department

Participate in any available committee and activity that would benefit the department.

Service to the school

I nominated myself to be part of the Student Affairs Committee and Diversity Committee. If elected, I will be able to participate in these committees to provide a significant service to the schools in areas I believe are very relevant to the improvement of the school in general.

Grants and professional development

Using the resources from the previous grants, research activities will take place, results will be produced, and will be presented in technical conferences.
Curriculum Vitae

TEACHING EXPERIENCE

Assistant Professor  September 2012 - Present
Department of Engineering
Central Connecticut State University, New Britain, Connecticut

I have taught courses in mechanical engineering including introduction to NX 8, Applied fluid mechanics, and Spreadsheet and Engineering Problem Solving Tools.

Assistant Professor  September 2010 – May 2012
Department of Mechanical Engineering Technology
New York City College of Technology
Brooklyn, New York

I have taught courses in mechanical engineering and industrial design, including introduction to AutoCAD, Engineering Structures, Introduction and Advance Material Science, Simulation, Product Design, Furniture Design, and Industrial Design I.

Adjunct Professor  August 2008 – May 2010
Department of Mechanical Engineering
The City College of the City University of New York
New York, New York

I taught a Numerical Methods class for mechanical engineering students. This course introduces the main concepts in numerical methods and applies them in a practical sense using Matlab.

Adjunct Professor  August 2005 – June 2008
Department of Science
Borough of Manhattan Community College
New York, New York

I taught the arithmetic based Physics course which is designed for students who are not science or math oriented.

Summer Pre-Engineering Workshop Instructor  September 2005 – June 2008
Department of Science
Borough of Manhattan Community College
New York, New York

I taught engineering freshmen students an introductory workshop in Physics, Mathematics, and Thermodynamics to prepare them for engineering curriculum.

Department of Science
Borough of Manhattan Community College
New York, New York

I taught high school students general concepts in Physics, Mathematics, and Computer Science in a college level and environment.
**RESEARCH EXPERIENCE**
Research Assistant
Department of Mechanical Engineering
The City College of the City University of New York
New York, New York

I conducted research on dynamics of multiphase-flow using lattice Boltzmann equation model.

**INDUSTRIAL EXPERIENCE**
Quality Engineer III
Telephonics Corporation
Farmingdale, New York

I reviewed purchase orders for inclusion of Quality Assurance requirements and I evaluated acceptance test procedures, qualification test procedures, qualification test plan and test reports.

Mechanical Engineering Intern
FTL Design Engineering Studio
New York, New York

I developed Finite Element Analysis on different models using FEMAP and NE/Nastran.

Mechanical Engineering Intern
Hoberman Designs
New York, New York

I designed and modeled 3-D prototypes using AutoDesk Inventor for different kinds of Unfolding Structures.

**EDUCATIONAL BACKGROUND**
Ph.D, Mechanical Engineering
The Graduate Center of the City University of New York
Advisor: Taehun Lee

Dissertation title “Lattice Boltzmann Simulation for Multiphase Flows in Micro-Channels”

Master of Engineering, Mechanical Engineering
The City College of the City University of New York

Thesis title “A Large-Eddy Simulation of Plume Impingement on an Unconfined Ceiling”

Bachelor of Science, Mechanical Engineering
The City College of The City University of New York

**GRANT AWARDS**
Principal Investigator
Research Grants
March 2013 - Present
AAUP

This $3700 grant aims to investigate the dynamic behavior of multiphase flows in micro-channel devices. This is a numerical investigation, which will utilize ANSYS-Fluent.

Principal Investigator
Connecticut Space Grant College Consortium
November 2012 - Present

This $7500 grant is a Curriculum Development awarded to be used in the Development of an Undergraduate Level Course for Engineering Analysis and Graduate Level Course for Computational Fluid Dynamics.
This $5900 grant was awarded to obtain a workstation and software to continue the research on dynamics of multiphase-flow in micro-channels using lattice Boltzmann equation model.

Co-Principal Investigator
GRTI Project - CUNY
This $10500 grant was awarded to purchase 12 different sets of LEGO® MINDSTORMS® combined with RobotC® programming software. The goal of this project is to establish a robotics workshop to introduce students to fundamental concepts of robotics and programming.

**GRANT APPLICATIONS**

Principal Investigator
Broadening Participation Research Initiation Grants in Engineering
Proposal aims to investigate the encapsulation process in micro-channel devices.

Principal Investigator
Collaborative Incentive Grant
Proposal aims to investigate the formation and evolution processes of droplet in high density medium in micro-channel devices.

**PUBLICATIONS**

**Peer reviewed journal papers**


**Abstract in Conference Proceedings**
Clifford Anderson, Ph.D., P.E.
Swamy C. Basim, PhD, P.E
**Peter Baumann:**

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**Creative Activity:**
Kirstukas and Baumann prepared unfunded CCSU Curriculum Development Grant Proposal “Creating a pathway for success: A way out for trapped and struggling engineering students”.

**Reports:**
Baumann prepared CCSU Mechanical Engineering Technology Fall 2012 Assessment Report.

**Service to the Department and University:**
Alfred A. Gates, Ph.D., P.E.
Chair Department of Engineering

Faculty Accomplishments

Conference Proceedings

- “Identification of High Speed Rotating Rotor Blades”; Fu-Shang Wei, Thomas J. Vasko, Alfred Gates; Conference & Exposition on Structural Dynamics, Garden Grove, California, February 11-14, 2013.


Positions outside CCSU:
- NASA Connecticut Space Grant Campus Director

Creative Activity:

Grants:
A.Gates, Summer Helicopter Program, June 16-21, 2013
Funding Agency: NASA Connecticut State Grant Consortium

National Outreach:
Alfred A. Gates Director of a NASA Sponsored helicopter work shop June 17-23, 2012. 20 Graduate and under graduate students attended CCSU and University of Hartford for a week long intensive program on principles of helicopter flight, low speed rotor blade aerodynamics, helicopter wind tunnel testing methods, introduction to unmanned aerial vehicles and vertical take of and landing aircraft. Funded by NASA Connecticut Space Grant.

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Khaled J. Hammad, Ph.D.

Teaching Activities

- Senior Project II: Design Project (ME 498)
- Energy Conversion Systems (ME 459)
- Heat Transfer (ME 454)
- Engineering Thermodynamics (ME 258)
- Applied Thermodynamics (ETM 358)
- Applied Fluid Mechanics (ET 354)

Research Projects

- CSU-AAUP University Research Grant: “Velocity and Momentum Decay Characteristics of a Submerged Viscoelastic Non-Newtonian Jet”
- CSU-AAUP University Research Grant: “Hemorheology and the Flow Behavior in a Separated Flow Region”
- “Experimentally Validated CFD Modeling of Turbulent Jet Flows,” in collaboration with University of Hartford

Consultation Projects

- “Thermal Analysis of High Temperature Furnaces,” for The Furnace Source

Conference Presentations


Conference Proceedings


Honors & Awards

• Named Chair of the “ASME Fluids Engineering Honors and Awards Committee”

• ASME Certificate of Appreciation Award for valued services in advancing the engineering profession as a “Topic Organizer” for the 2012 ASME International Mechanical Engineering Congress & Exposition. The ASME International Mechanical Engineering Congress and Exposition is the premier ASME global conference. It convenes engineers, scientists and technologists of all disciplines to explore solutions to global challenges and contributes to the advancement of engineering excellence worldwide.

• ASME Certificate of Appreciation Award for valued services in advancing the engineering profession as a “Session Chair” for the 2012 ASME International Mechanical Engineering Congress & Exposition.

Leadership

• Chair: “ASME Fluids Engineering Honors and Awards Committee”
Organizer: The ASME 2012 International Mechanical Engineering Congress & Exposition (IMECE2012), Houston, TX, Nov. 9-15, 2012. Organized the following technical topic:
  o Measurement Technology and Engineering: Methods, Systems and Uncertainty

Technical Session Chair: The ASME 2012 International Mechanical Engineering Congress & Exposition (IMECE2012), Houston, TX, Nov. 9-15, 2012. Chaired the following technical session:
  o Jets and Wakes
  o Measurement Techniques (sessions I & II)
  o Measurement Technology and Engineering: Sensor Systems
  o Measurement Technology and Engineering: Methods and Implementation (sessions 1 & 2)

Organizer: The ASME 2012 Heat Transfer, Fluids Engineering, & NanoChannels, MicroChannels, and MiniChannels Conference, Puerto Rico, USA, July 8-12, 2012. Organized the following technical tracks:
  o 11th Symposium on Fundamental Issues and Perspectives in Fluid Mechanics
  o 5th Symposium on Transport Phenomena in Energy Conversion from Clean and Sustainable Resources Organizer
  o 5th Symposium on the Transport Phenomena in Mixing

Technical Session Chair: The ASME 2012 Heat Transfer, Fluids Engineering, & NanoChannels, MicroChannels, and MiniChannels Conference, Puerto Rico, USA, July 8-12, 2012. Chaired the following technical sessions:
  o Flow over Bluff Bodies
  o Transport Phenomena in Mixing
  o Transport Phenomena in Energy Conversion (Sessions I & II)

Technical Review Activities (>10 during 2012-2013)

  • AIAA Journal
  • ASME Journal of Fluids Engineering
  • Experimental Techniques Journal
  • Microfluidics and Nanofluidics Journal
  • 2012 ASME Heat Transfer, Fluids Engineering, and NanoChannels, MicroChannels and MiniChannels Conference
  • 2012 ASME International Mechanical Engineering Congress and Exhibition
Membership in professional Societies

- American Society of Mechanical Engineers (ASME) - member
- American Institute of Aeronautics and Astronautics (AIAA) – senior member
- American Institute of Chemical Engineers (AIChE) - member

Service to the Department and University

- Academic Standards Committee, 2011-2013
- Department of Engineering AAUP Liaison, 2011-present
- Department of Engineering Search Committees

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Steven Kirstukas, Ph.D. Accomplishments 2012-2013

Teaching Activities
Taught nine classes:
- ENGR 150 Intro to Engineering
- ENGR 240 Spreadsht & Engn Prob Solv Tools (three sections)
- ENGR 251 Statics
- ENGR 257 Mechanics of Materials (two sections)
- ETM 260 CAD/CAM/CIM (two sections)

Creative Activities

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Journal Publications
N/A

Conference Presentations


Conference Proceedings


Journals Reviewer
N/A

Consultation Projects
I have been involved with the VE-Suite project (vesuite.org) at Iowa State University since 2001. In short, VE-Suite is an open-source engineering software toolkit that enables simultaneous interaction with various engineering analyses and models within a virtual decision-making environment. The toolkit connects the various necessary software tools that engineers use and allows for real-time, collaborative design by a team that may be composed of engineers, designers, and managers.

My recent contribution to the code base allows VE-Suite to interact with a running engineering simulation in MATLAB Simulink.

Research Projects
Request for Reassigned Time, Steven J. Kirstukas and Nidal A. Al-Masoud, “Verification of hardware, development of software, and creation of laboratory manual for various courses that will use the Control Systems Laboratory”, 6 load credits total, Pending.


External Grant Funding

External Grant Funding Proposals

Service to the Department and University
University Committee Work
• CCSU Academic Integrity Committee, Vice-Chair, August 2012 – present
• CCSU Graduate Studies Committee, August 2011 – present
• CCSU Information Technology Committee, October 2010 – present

Department of Engineering Search Committees
• Member, Engineering Department Search #C13-020

Professional Activity
Membership in Professional Organizations
• American Society of Mechanical Engineering (ASME)
• American Society for Engineering Education (ASEE)
• Society of Manufacturing Engineers (SME)
• Tau Beta Pi Engineering Honor Society
• Tau Beta Pi, Central Connecticut Alumnus Chapter
Edward Moore Faculty Accomplishments 2012-2013

Contributions to CCSU Areas of Distinctiveness
  Program Coordinator and Board Member, American Society of Mechanical Engineers, New Haven Section.

Summary of Faculty Accomplishments

Creative Activity

Journal Publications

Reviewer
  1. Edward Moore reviewed five papers for the National Conference for the American Society for Engineering Education

External Grant Funding
  Edward Moore – The CT Space Grant Consortium, $1000.

Service to the Department and University
  Edward Moore – Academic Standards Committee member.
1. Teaching Activities

Classes taught: 9.

Fall 2012: ME 480-01, ET361-01, ET361-70, ME 454-01, ME 498-01.

Spring 2012: ME 370-01, ME 483-70, ME 454-01, ME 498-70.

In Spring 2013 I developed new ME 454 lab exercise and prepared Lab Manual “Experimental Study of Heat Transfer in the Shell and Tube Heat Exchanger” (co-author – Dr. K. Hammad). I also updated slides for ME 370.

2. Creative Activities

Peer-reviewed papers


Presentations

V. Naoumov, N. Al-Masoud. "The Role of Mechanical Engineering Diversity in Design Capstone Team Project”.

51th Aerospace Science Meeting and Exhibit, January 7-10, 2013, Dallas/Ft.Worth Region, TX.
V. Naoumov, N. Al-Masoud, A. Haralambous, A. Goldreich, E. Monsy. “Senior Capstone Design Project for Aerospace Specialization and Student-Faculty Research on Propulsion”.

Grants

13. CSU AAUP 2012/13 Research Grant ($5,000) “RESEARCH ON THE COMBUSTION OF NON-CONVENTIONAL AND BIO-DERIVED FUELS IN HYBRID PROPELLANT ROCKET ENGINE: PHASE-II”. PI.

15. CCSU 2012/13 Faculty Development Grant “Presentation of Two Research Papers at the 51st QAIAA Aerospace Science Meeting Including New Horizons Forum and Aerospace Exposition.” ($1,500).


17. Grant from SET, ($2,000) “Hybrid Propellant Rocket Engine - Paraffin and Bee’s Wax”, (2012/13) PI.

18. CCSU Foundation, ($3,145) “CCSU Foundation gift in support of the SET for the benefit of the Moonbuggy and HPRE Projects”. PI.

19. CSU AAUP 2013/14 Research Grant ($4,000) “EXPERIMENTAL AND THEORETICAL RESEARCH ON THE COMBUSTION OF BIO-DERIVED FUELS WITH ADDITIVES IN HYBRID PROPELLANT ROCKET ENGINE: PHASE-III”, PI.

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3. **Service to Department, University and Community**

1. Member of Faculty Senate Diversity Committee.

2. Faculty Advisor of CCSU Lunar Exploration Club.

3. Mentor of CCSU Moonbuggy team. Participated with CCSU team in the 20th NASA Great Moonbuggy Race, April 25th -27th in NASA Marshall Space Center, Huntsville AL (Fig. 1). The team was 6th out of 48 universities US, European and Asian Universities.

4. Mentor of Hybrid Propellant Rocket Engine faculty/student research project (Fig. 2)

Zbigniew Prusak, Ph.D.
Thomas J. Vasko, PhD, PE, 2012-2013

Journal Publications


Conference Presentations
• “Comparison of a First-Year-Experience Course with and without a Living-Learning-Community Arrangement”; Vasko T.J., Baumann P.; Accepted for presentation at the American Society for Engineering Education 2012 Annual Conference; San Antonio, Texas; June 10-13, 2012.

Conference Proceedings
• “Identification of High Speed Rotating Rotor Blades”; Fu-Shang Wei, Thomas J. Vasko, Alfred Gates; Conference & Exposition on Structural Dynamics, Garden Grove, California, February 11-14, 2013.


• “Comparison of a First-Year-Experience Course with and without a Living-Learning-Community Arrangement”; Vasko T.J., Baumann P.; Accepted for the American Society for Engineering Education 2012 Annual Conference Proceedings; San Antonio, Texas; June 10-13, 2012

Journals Reviewer

Consultation Projects

External Grant Funding
• Federal Aviation Administration (FAA) Grant Award: “Non-Linear Finite Element Modeling Guidelines for Aerospace Impact Applications”; $60,000.00

External Grant Funding Proposals

• Federal Aviation Administration (FAA) Grant Proposal: “Non-Linear Finite Element Modeling Guidelines for Aerospace Impact Applications”; April 2012; $60,000.00

Service to the Department and University

• Curriculum Committee Engineering Representative, 2010-Present
  o General Education Subcommittee Representative
  o SET Subcommittee Representative
• Academic Assessment Committee, 2010-Present
  o SET Representative
• Center for Teaching and Faculty Development (CTFD)
  o Member of the Board of Advisors, 2011-Present
• Department of Engineering Search Committees
  o Civil Engineering Faculty Search C13-026
• First Year Experience Committee Engineering Representative, 2009-Present
• CCSU Engineer’s Week
  o Organized 2013 Engineers’ Week Events
    ▪ Dr. Brian Wake & Dr. Blake Moffitt, “Sikorsky X2 Technology Demonstrator at United Technologies Research Center,” February 20, 2013
    ▪ Mr. Mark Austin, “Civil Engineering in the Municipal Environment,” February 21, 2013

Community Engagement

• MathCounts Participation – MathCounts is a national competition sponsored by the National Society of Professional Engineers to encourage the study of math in 7th and 8th grade students and introduce students to engineering careers
  o Hartford Chapter Competition – February 2, 2013
  o Connecticut State Competition – March 9, 2013

Professional Activity

• Connecticut Society of Professional Engineers (CSPE); Member, Board of Directors
• ASME - Member, 1977-Present
• AIAA - Senior Member, 1989-Present
• ASEE - Member, 2010-Present
• Tau Beta Pi - Member, 1977-Present
• Pi Tau Sigma - Member, 1977-Present
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2012-13 Faculty Accomplishments

John Wei

During the 2012-2013 semester, Dr. John Wei, Alfred Gates & Thomas Vasko from the Department of Engineering, Central Connecticut State University published technical papers in two highly prestigious and nationally known conferences. The first paper was published in January 2013 in the American Institute of Aeronautics and Astronautics (AIAA) 51st Aerospace Sciences Meeting at Grapevine, Texas. The other was published in February 2013 in the XXXI International Modal Analysis Conference (IMAC-XXXI) at Grove, California.

Both papers concern helicopter rotor blade improvement research in the area of rotor performance design evaluation and blade test stand whirl testing. The work for these papers was partially supported by a NASA CT Space Grant and CCSU Engineering Student/Faculty research grant. These efforts will provide a strong foundation for future helicopter rotor blade improvement research at CCSU.

The first paper addresses “Servo-Flap Rotor Performance Design Evaluation.” Traditionally, the external servo-flap has been considered a control surface, not a lifting surface. This paper treats the external servo-flap aerodynamic surface not only as a control surface, but also as part of the main rotor blade lifting surface. Looking at the external servo-flap aerodynamic surface in this way significantly affects the calculation of blade solidity and performance. Four different servo-flap sizes and locations are investigated to evaluate the impact on blade thrust weighted chord and rotor performance. This approach yields greater values for the equivalent thrust weighted chord, ranging from 7.3% to 10.7% with the existing servo-flap size. For a 6-inch longer servo-flap length design, the overall equivalent blade chord increase will range from 9.5% to 12.2%. A 6-inch flap size reduction, combined with a 4.5-inch aft move of the flap attached location, will produce approximately the same amount of blade control effectiveness without increasing any blade weight. The best hover performance is achieved at around 2° servo-flap angle and 4.7° blade angle of attack under lift coefficient $C_L= 0.6$ flight
condition or at around 4° servo-flap angle and 5.6° blade angle of attack under lift coefficient $C_L=0.8$.

The second paper addresses the “Identification of High Speed Rotating Rotor Blades.” CCSU faculty and senior students worked as a team to build a small scale, high speed counter-rotating rotor helicopter, and tested it on a whirl stand to identify blade design parameters. The project involved scaling down the optimal features of an existing rotor system based on its maximum payload capability. The blade components were chosen to be as light weight as possible in order to achieve the maximum thrust to power ratio. The purpose of this project was to design a scaled version of the full size helicopter that could be built for a fraction of the cost. The instrumentation installed on the test system includes load cells, rotor rpm and power measurement. The counter-rotating rotor blade tests were conducted by varying engine throttle positions and blade root end pitch angles. Data collected during the test provided the opportunity to identify blade loads, dynamic component strength, power required and rotor speed under different rotor thrust conditions. One of the key objectives of this project was to come up with a design process and a fully functional rotor system to be used as a test bed for future full scale rotor design improvements.
Brenda Zhou

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**Creative activity:**

My 2013 National Summer Transportation Institute (NSTI) Program proposal was accepted by Federal Highway Administration (FHWA). The NSTI program is to provide local high school students with vital opportunities to learn what transportation is, why transportation is important, and how they can work as proud transportation planners/engineers in the future.

**Journal reviewer:**

- Five papers submitted to Transportation Research Board (TRB) Committee on Transportation and Land Development (ADD30) for presentation at the 91st annual meeting of the TRB and for publication in *Transportation Research Record*
- Two papers submitted to Transportation Research Board (TRB) Committee on Integrated Transportation and Land Use Modeling Joint Subcommittee (ADB40-2) for presentation at the 91st annual meeting of the TRB and for publication in *Transportation Research Record*
- One paper submitted to *Computers Environment and Urban Systems*
- One paper submitted to *Journal of Urban Planning and Development*

**External grant funding:**

1. **Federal Highway Administration**, National Summer Transportation Institute Program, $14,754, 2013 Summer.

2. **External grant funding proposals:**

SE&T Career Services - Fall 2012 & Spring 2013 Activities
Career Services within the School of Engineering and Technology (SE&T) is flourishing. The past year was full of activities including resume reviews, interview preparation, visits from employers, targeted career fairs and hundreds of job postings on the website.

Resume & Interviewing Preparation
Diane Hunter, Career Services Coordinator, has been busy assisting students with resume writing and interviewing preparation. She has updated and improved the resume writing and interviewing guidelines. She provides resume proofreading and has conferences with students to ensure students’ resumes are as powerful as possible. Mrs. Hunter has also met with students to fully prepare them for the interview process, including performing mock interviews.

Industry Contacts, Job Postings and Website
Mrs. Hunter manages the Career Services section of the SE&T Website. The website includes career advice as well as job postings for permanent employment, co-operative employment, and internship positions. She has increased her contact list to well over 375 companies within the local industry in the areas of Engineering, Construction Management, Information Technology and other technology areas. This has led to over 200 job postings over the past year. The job postings provide a direct link to the employers so students can apply on their own. During the semester, new postings come in on a daily basis.

Co-operative Education Program
Mrs. Hunter gets involved with collecting resumes and setting up on-campus interviews for the co-op positions that need to be more carefully monitored. She also works with the Center for Advising and Career Exploration (CACE) to ensure students follow the proper procedure for co-op positions. Mrs. Hunter works closely with Joe Zeoli of CACE to ensure that students are aware of all of the co-op opportunities that exist within CCSU.

SE&T Career Fairs
The Engineering and Manufacturing and Construction Management Departments at CCSU hosted a fall semester Engineering and Manufacturing Career Fair on Wednesday, November 7, 2012. Due to an unexpected snow storm, there were only about 17 employers who participated and approximately 100 students in attendance. Originally there were 53 employers and 200 students scheduled to attend. Companies in attendance included Sikorsky Aircraft, Pratt & Whitney, General Dynamics, and Turner Construction. There were also several other local mechanical, manufacturing and civil engineering firms represented. Students were able to talk with company representatives first hand to learn about job openings for internships, co-ops and permanent employment.

The event was organized by Mrs. Hunter. Participating companies were provided with display tables and copies of students’ resumes. Students were provided in advance with company names and website links to prepare for the event. Students were well prepared, well dressed and made a great impression upon the company representatives.

On Thursday, March 21, 2013 Mrs. Hunter also coordinated a spring Engineering, Manufacturing and Construction Management Career Fair. The spring fair attracted 65 employers and had around 200 students in attendance. About half of the employers were in the Mechanical and Manufacturing areas and half in the Civil Engineering and Construction Management areas. Companies in attendance included the Connecticut Department of Transportation, Tilcon, UTC Aerospace Systems, Whelen Engineering, and Barnes Aerospace. Much positive feedback was received from employers, students and faculty.
Data Collection
Mrs. Hunter finishes each semester with organizing files of student resumes, updating the industry contacts spreadsheet, recording activity logs and collecting statistical data on student employment as best as possible.