

**NOMINATION COVER SHEET**  
**2008 Virginia Outstanding Faculty Awards**

<b>1. NAME</b> Full (Legal): Walerian Majewski  Preferred First Name: Walerian	
<b>2. INSTITUTIONAL INFORMATION</b>  Institution: Northern Virginia Community College  Rank/Position Title: Professor  Year Rank/Title Attained: 1995  Years at Institution: 25  Campus Email Address: wmajewski@nvcc.edu  Campus Phone: 703-323-2143  Campus Mailing Address: 8333 Little River Turnpike Annandale, Virginia 22003	<b>3. PROFESSIONAL INFORMATION</b>  Academic Discipline: Physics  Specialization/Field: Theoretical Physics  Type of Terminal Degree: PH. D.  Year Awarded: 1970  Awarding Institution: Institute of Physics, Polish Academy of Sciences Warsaw, Poland
<b>4. PERSONAL INFORMATION</b>  Home Phone: 703-323-1487  Home Mailing Address: 9021 Phoebe Court Annandale, Virginia 22003	

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**Please check only ONE box:**

- RESEARCH/DOCTORAL INSTITUTION NOMINEE:   
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 TEACHING WITH TECHNOLOGY NOMINEE:

**President or Chief Academic Officer**

Signature:

Printed Name: John T. Dever, Executive Vice President, Academic & Student Services

MISSION STATEMENT  
NORTHERN VIRGINIA COMMUNITY COLLEGE

The mission of Northern Virginia Community College is to respond to the educational needs of its dynamic and diverse constituencies through an array of comprehensive programs and services that facilitate learning and workforce development in an environment of open access and through lifelong educational opportunities.

## SUMMARY OF ACCOMPLISHMENTS

### I. Teaching

Dr. Majewski is an extraordinary physics educator who is extremely popular with his students. They rate his classes difficult, but recommend them highly to other students. They praise his depth of knowledge, his enthusiasm, and his skill as an innovative, master teacher who makes physics exciting. They say he is inspiring. They selected him three times as the Faculty of the Year, NVCC honored him as an Outstanding Faculty, and VCCS twice honored him as VCCS Chancellor's Commonwealth Professor. He is an effective advocate for physics education who led a successful campaign to encourage liberal arts majors to take physics electives that nearly doubled physics enrollment in one year. He founded seminars to bring physics professionals to campus to speak to student and faculty groups. He established the local chapter of the Society of Physics Students (SPS), and, as its advisor, is happy to report the chapter has received five Outstanding Chapter awards. He encourages his SPS members to join him in physics-education outreach programs at the local public schools. He takes his students off-campus to physics laboratories to expose them to real-life research, and he has formed education partnerships with some of these facilities. He is a VCCS pioneer in Web-based distance physics education, having developed 7 on-line physics courses. He was also the first to teach honors physics courses and to use in his classes electronic physics textbooks. Dr. Majewski is an innovative and dedicated teacher, and he is a practicing physicist who is actively engaged in research on physics education. His influence is reaching far across Virginia.

Dr. Majewski began teaching at Northern Virginia Community College (NVCC) in 1982, taught as a visiting professor at University of Missouri in Columbia, MO and later at George Mason University (GMU), Fairfax, VA. Over the years this versatile teacher has taught the full range of 25 different physics courses – lectures and laboratories. Besides regular introductory undergraduate courses at several levels of difficulty, he taught

#### **Upper-level undergraduate courses:**

*Electromagnetic Theory* -PHYS 305 at GMU.

*Classical Mechanics* -Physics 4130 at University of Missouri.

#### **Graduate courses:**

*Introduction to Quantum Mechanics and Atomic Physics I, II* -PHYS 402, 502 at GMU.

*Applied Electromagnetic Theory* -PHYS 513 at GMU.

*Introduction to Quantum Mechanics I, II* -Physics 4800, 4810 at University of Missouri.

Dr. Majewski thoroughly enjoys teaching introductory courses, but he has found it beneficial to spend extra time and effort teaching some upper-level courses and working with graduate students. Working at a higher level advances his professional development and ultimately revitalizes and extends his skills as a teacher at NVCC. His **two full-year sabbatical visiting appointments at GMU and a semester of visits to the research laboratories** of Harvard University, the Thomas Jefferson National Accelerator Facility (Jefferson Lab), Newport News, Virginia, and the National High Magnetic Field Laboratory (NHMFL), Tallahassee, Florida, permitted him to interact with university and research laboratory physicists to pick up fresh ideas for his NVCC classes and undergraduate research projects. Students reacted enthusiastically by praising his courses, and his supervisors responded with excellent ratings on annual evaluations.

Dr. Majewski was one of the first teachers at NVCC to see and act on the potential benefits for teaching and learning of the Web on-line tools. He decided to concentrate on implementing technology-based teaching methods, developing at first Web lectures for calculus-based and

algebra-based physics courses. Next, he initiated physics hybrid courses and distance learning courses at NVCC, using for instruction his Web lectures linked to his Blackboard course sites. After his campus purchased the latest computer-assisted laboratory equipment, he wrote lab manuals for the experiments and posted them on the Web. Besides standard experiments, he introduced many experiments in modern physics, including Planck's Constant-to-Electric Charge Ratio, Milliken's Electric Charge Measurement, Coulomb's Law, Muon Decay Lifetime, Superconductivity, etc.

His **course development** included:

- honors course in Physics Undergraduate Research Projects, since 1985
- regular Undergraduate Physics Seminars, since 1990
- two conceptual physics courses for non-science majors, since 1991
- three multimedia physics courses for NVCC engineering/science program, 1995
- three on-line hybrid physics courses, since 1999
- seven on-line distance learning courses, since 2005

**Conceptual Physics Project:** NVCC did not offer physics courses for non-science majors until 1991, when Dr. Majewski initiated two elective courses, Introductory Physics PHY 101 and PHY 102. He used his 25-member strong Society of Physics Students (SPS) to actively recruit liberal arts students in a major campaign designed to overcome a wide-spread fear of physics among them. The campaign's motto, placed on posters and on countless leaflets around the campus, was adopted from Einstein: "Physics is accessible to everyone!" In the past, elective physics courses never made enrollment. This time, against all odds, Annandale Campus enrolled the largest physics classes ever at NVCC: 60 students in the spring, 110 in the fall of 1991, and 145 in the spring of 1992. In one year his action nearly doubled the total physics enrollment at Annandale Campus. As a result, NVCC promoted conceptual physics courses at four of its campuses, and in the Fall 2007 there are close to 100 enrolled students.

**Distant Learning Physics Project:** Between 2005 and 2007 Dr. Majewski introduced a full set of seven physics courses into the VCCS distant education offerings through NVCC Extended Learning Institute. The courses cover all three levels of undergraduate physics: conceptual, algebra-based and calculus-based. In his summer-fall courses of 2007, he enrolled close to 100 distant students, coming mostly from Northern Virginia, but also from places up to 230 miles from Annandale. Students are using novel electronic, highly interactive CD textbooks from Kinetic Books, Inc, together with simulated lab experiments on a CD, and attend several on-campus laboratory sessions.

**Summer Hybrid Physics Project:** Each summer his hybrid classes (50% of learning done over Web, and 50% on campus) attract around 60 Northern Virginia students who during the school year are away from home. About a quarter of this class is coming from each of the four big Virginia schools: University of Virginia, Virginia Polytechnic Institute, G. Mason University and NVCC, but also from Virginia Military Institute, James Madison U. and other Virginia institutions of higher education. There are also students from as far away as Stanford University, U. of Michigan, U. of California, Penn State U., Rochester Institute of Technology, and others. They are students majoring in Mechanical, Electrical, Civil, Industrial, Computer, Systems, Chemical, Air and Space, Biomedical, Biosystems engineering and in physics.

Since 1982 Dr. Majewski has **taught physics to approximately 3,800 NVCC students, 1,000 GMU students and 1,200 summer students from all of Virginia.** He is truly an all-Virginia physics educator.

Dr. Majewski has great successes in **the student development.** Every spring he nominates several of his outstanding physics students for the divisional Physics Achievement Award and locates summer internships and scholarships for them. One of his former students, Stewart Soon, after receiving an M.S. degree from GMU is now teaching physics at NVCC. Other former students have earned a Ph.D. in physics from GMU and other institutions. His

collaboration and part-time or sabbatical teaching at the GMU Physics Department over the years has resulted in many of his students transferring to GMU to become research physicists, such as Drs. Jarek Tuszynski, Robert Doney and Sean Milder. Often, Dr. Majewski was also one of their GMU graduate level teachers.

## II. Discovery

Before coming to NVCC, Dr. Majewski devoted years of research to Theoretical Elementary Particle Physics. He produced research publications in refereed journals on weak interactions, symmetries of strong interactions, parity violation in atoms, and processes in strong electromagnetic fields, and he presented the material at international conferences. He pursued research at some of the foremost laboratories of the world, among them the Joint Institute for Nuclear Research at Dubna in Russia, the Institute of Physics, Polish Academy of Sciences in Warsaw, Poland, the University of Missouri, Harvard University, Brandeis University, and the University of Maryland. Three of his current research interests are Multipole Decomposition of Electromagnetic Interactions, Parity Violation in Atomic Physics, and Research-Based Methods of Teaching Physics.

### NVCC Undergraduate Research Program

At community colleges, students often lack the early exposure to research that is common at four-year institutions. Laboratory facilities at NVCC are limited, but Dr. Majewski designed a number of experiments and incorporated them into an existing program called "Teaching Through the Projects." Since 1985, his students in the Honors course "Physics Project" PHY 298 have worked on these innovative and ambitious experiments, and he has been successful in enlisting the cooperation and partnership of a number of significant research facilities, such as the Thomas Jefferson National Accelerator Facility (Jefferson Lab); the Department of Mechanical Engineering, Florida State University (FSU), Tallahassee; the National High Magnetic Field Laboratory, Tallahassee; and the Nuclear Engineering Department at the University of Maryland.

He collaborated with the Solid State Physics Laboratory of Professor P. Gielisse, from FSU and with Professor H. Niculescu, Department of Physics, Florida A&M University, to develop a series of undergraduate research projects in superconductivity:

**"Superconducting Meissner-Effect Heat Engine"** (based on an idea proposed by a group from AEG Forschungsinstitut, Frankfurt, 1989, unpublished). The project won a 1992 Undergraduate Research Award from the national SPS, the only community college project winner. NVCC students built two working models of the engine which converts heat energy from the surrounding air into kinetic energy for the rotating flywheel. The paper was presented at several conferences and the model demonstrated in many NVCC science classes.

**"Measurements of Critical Current Density in Yttrium and Bismuth Superconductors by Novel Non-Contact Magnetic Induction Method"** (based on a paper by E. Harris et al, J.Phys. C 21, L637 (1988). Dr. Majewski's students built small transformers for their measurements and in 1991-1993, presented the results at the conferences.

**"A Flywheel System with Frictionless Magnetic Levitation Bearings"** (based on a paper by H.J. Bornemann, et al, Institut fur Nukleare Festkorperphysik, Karlsruhe), supported by the SPS research grant in 2005; results were presented in 2005 and 2006 at the American Physical Society conference.

The next two experiments were related to nuclear and particle physics:

**“Lifetime of the Cosmic Ray Muons”** The experiment was developed in collaboration with Dr. R. Wojcik from the Jefferson Lab and was supported in 2003 by an SPS Undergraduate Research Award and an award from the NVCC Educational Foundation. Students from the Honors Class PHY 298 measure a lifetime of unstable elementary particle – muon - working with a scintillation muon detector and using computer programs to acquire and analyze the data from the stream of muons flowing into the laboratory from space and decaying into an electron and two neutrinos. Student teams presented research results in 2005 at student sessions of meetings of the American Physical Society, the American Association of Physics Teachers, and at regional meetings of the SPS.

**Nuclear Reactor Experiments:** As a part of a reactor-sharing program supported by a grant from the Department of Energy awarded to the Nuclear Engineering Department of the University of Maryland, Dr. Majewski’s students from Modern Physics class PHY 243 performed experiments such as “Neutron-Activation Analysis” on the University’s TRIGA Research Reactor in College Park, MD.

**NVCC-Annandale Physics Seminar:** In 1990, Dr. Majewski organized the first physics seminar for students – originally a weekly event, and now he continues to manage this very popular series on a monthly basis. Usually, speakers are physicists from area universities who come to NVCC to talk about their current research. Dr. Majewski is very proud that several of the recent seminar speakers have been his own former students who have returned as Ph.D. physicists to address the current students. The seminar contributes substantially to increased interest in physics, connects NVCC to the area scientific community, and stimulates the intellectual climate on the campus.

**Tours of research laboratories:** Dr. Majewski regularly takes his students to the Thomas Jefferson National Electron Accelerator Laboratory, Newport News, VA; the National Institute of Standards and Technology, Gaithersburg, MD; the Goddard Space Flight Center, Greenbelt, MD; the Naval Research Laboratory, Washington, DC; the Lake Anna Nuclear Power Plant, VA; the Krasnow Advanced Study Institute, Fairfax, VA.

**2004 NVCC President’s Sabbatical Award:** Dr. Majewski visited and performed education-related research at three leading national physics centers – Harvard University, the Thomas Jefferson National Electron Accelerator Laboratory, and the National High Magnetic Field Laboratory, which supplied additional grant funding. At the two national laboratories, he was exposed to a variety of current research related to his work. At Harvard, he consulted with the Harvard Physics Education Group of Professor Eric Mazur’s different aspects of research-based teaching.

**2004 Harvard Research Study** for the National Science Foundation aiming to assess the effectiveness of and attitudes toward different teaching techniques. Dr. Majewski recruited 10 of his fellow NVCC physics instructors to offer online surveys to their students, and about 400 NVCC students participated in this country-wide study.

### **III. Integration of Knowledge**

Dr. Majewski’s continued research pursuits have enabled him to actively keep in touch with current exciting developments in physics. He uses his intimate understanding of these new

concepts to introduce them to NVCC students in particularly clear and clever ways, both in laboratory classes and lectures.

In 1992-94, he won recognition as the **VCCS Chancellor's Commonwealth Professor** and was given reassigned time for his educational projects and his research in atomic parity violation. In 2005, he was again selected as the Commonwealth Professor for 2005-2007, this time for his self-directed project to extend research-proven methods of interactive teaching into on-line distance learning of physics.

He continues, as a part of his current Commonwealth Professor project, his long-standing research interests in atomic and particle physics by working on the problem of the atomic anapole moment and the cosmic ray muon lifetime experiment as a teaching tool in the modern physics laboratory.

To integrate his own research into teaching, he used ideas from his early publication (W.Majewski, Bull. Amer. Phys. Soc. 26, 60 (1981)) to develop a series of **experiments on toroidal currents and magnetic rings**, which are physical models for atoms or particles with anapole moment. From his work in atomic physics, he determined that an atom will gain a new electromagnetic parameter – a transverse, or toroidal, electric dipole moment, interacting with the curl of the magnetic field in a parity-non-conserving way. This dipole is also called the anapole moment. Its classical model is a toroidal current. Dr. Majewski's student group built toroidal coils and closed-loop magnets and investigated their interactions with electric currents. They presented their results at several meetings of American Association of Physics Teachers, and of the American Physical Society's Student Research. Dr. Majewski's work on electromagnetic multipole interactions has also educational implications for teaching electric and magnetic multipole expansion in university courses on Electricity and Magnetism.

#### IV. Service

In 1990, Dr. Majewski established the **NVCC Chapter of the Society of Physics Students** (SPS) – one of the first community college chapters in the country. Under his guidance, members won five Outstanding Chapter awards from the national organization. At times the NVCC chapter had as many as 40 members, making it the largest and most active chapter of SPS among US community colleges. In 2002, the SPS presented Dr. Majewski with its highest honor, the **Outstanding Advisor Award** at a special session of the American Association of Physics Teachers in Philadelphia. His annual reports on the activities of the NVCC chapter have been presented at national educational conferences as exemplary models of what the Society can achieve at a community college campus. NVCC has named Dr. Majewski "Advisor of the Year" several times, and NVCC has recognized its SPS chapter as "Student Organization of the Year." NVCC SPS students have won five SPS-ΣΠΣ **Undergraduate Research Awards** and a Marsh White SPS Award for "Physics is for Everyone" physics show from national SPS. Student members co-sponsored regular Physics Seminars, and made SPS important on campus. SPS students reached out to the community by collecting used computers donated by companies such as Mitre Corporation and sending them to children at foster homes. The students sponsored chess tournaments, including a simultaneous play with a chess master. Dr. Majewski has arranged many physics laboratory tours, but also a trip to the National Gallery of Art. Sometimes he has current and former SPS students meet for a Physics Party in his backyard.

**Physics Shows for Elementary Schools:** With help from the SPS, Dr. Majewski regularly organized Physics Shows at the area elementary schools. Since 1985, he served on the

steering committee for the NVCC “Adopt-a School” project, coordinating NVCC’s partnership with Timber Lane Elementary School which had a predominantly (60%) minority student body. For many years, his honors class students and members of the SPS held successful “Physics Shows” for 250 children. They advised 100 children from the English as a Second language classes on their Science Fair projects at this and several other schools. NVCC student mentors served as role models, demonstrating to Timber Lane children that college is a possibility in their futures. Ten years later, in 1999, one of these former Timber Lane students enrolled in Dr. Majewski’s physics classes at NVCC and later transferred to GMU as a physics major! He is now working as an expert with the US Patent Office.

**Chair, Physics Jury at the Virginia State Science and Technology Fair:** From 1986 until 2000, Dr. Majewski served regularly as a judge and as a Chair for Physics at the Virginia State Science Fair in Loudoun and in Annandale, VA, and also judged frequently at Thomas Jefferson High School for Science and Technology, Alexandria, VA, which is known nationally for its science program.

**Radon Alert Project:** He used a grant he received from the Environmental Protection Agency to purchase radon detectors, used by his students to measure **radon levels** in 20 buildings on all five campuses of NVCC and in NVCC faculty and students’ houses. He lectured on the dangers of in-house radon exposure.

**VCCS Professional Development Program:** In 1991-1992, Dr. Majewski participated in the VCCS Professional Development Initiative supported by the Department of Education’s grant to the Community College Center at GMU. Later he was a member of the VCCS Chancellor’s Task Force, which in 1993 established the current VCCS Professional Development Program.

He is a regular participant on new faculty selection committees, and mentors new physics instructors. He served for three years on the Editorial Board of the NVCC’s journal *Northern Virginia Review*. For another three years, he chaired the Divisional Safety Committee, while it conducted an extensive review of safety in all science laboratories and rewrote lab safety rules. He participated in the governance system of the College as a member of the Annandale Campus Council. He served as vice-president for community colleges of the Chesapeake chapter of the American Association of Physics Teachers.

**Citizenship education of students:**

Every year in January “Physics goes to Richmond”: a group of SPS students travels with the NVCC delegation to Richmond for Community College Day; they visit our delegates and senators asking for more support for higher education.

Every year in March, Dr. Majewski mobilizes large groups of his physics students to volunteer in the NVCC Educational Foundation’s fundraising “Phonathon,” which typically brings the Foundation an additional \$10,000 of funds to support classroom technology and to provide scholarships to students.

## PERSONAL STATEMENT

My **teaching philosophy** derives from the personal experience of coming to teach undergraduate physics at a community college after years of research in theoretical elementary particle physics. In my classes, I have to deal with the very diverse physics and cultural backgrounds of my students. It is known that up to 70% of American high school graduates who expect to go to a four-year college do not take physics in high school, so, for many of my students, my course is the first physics course in their lives. I have to do a lot of remedial/developmental work in physics and mathematics. Up to 50 per cent of my students are minority or foreign students, and for the foreign students, language problems add to the difficulty of learning how to apply math to physics. Adult, mature students from my evening classes come to NVCC from area businesses high in technology to advance their education, sometimes after many years of interruption of their studies. Some of my students are very bright and well prepared, and I have to keep up their interest in physics. I have to respond to all those individual student needs and to provide all of them with different "entry points" into the world of physics.

My mission as a professional physicist at this college and in the community of Northern Virginia is to promote my conviction that human society has an unlimited future only through constant progress in science. Physics is the most fundamental of all sciences, its goal being the ordering of the world around us into a fairly small number of physical laws. I believe that my students will overcome their fear of physics and make an effort to learn it, if I am able to show them the beauty and excitement of this science, to demonstrate to them that physics is an intellectually stimulating activity, and that the great theories of physics can be compared with great works of art.

I understand that my mission is to help students, otherwise barred from higher education by ethnicity, race, economic and geographic barriers, to learn physics and to use it practically to achieve their goals in life. I also have to reach into the surrounding community to help erase scientific illiteracy, to promote understanding and the love of physics among elementary and high school students. I am in a profession where I am helping people, which I enjoy doing. I know that in my courses a great deal is at stake for the students. For my engineering transfer students, the understanding of the physical basis of the technology is crucial if they are to have a real chance to succeed in their field. I am even sometimes successful in encouraging them to choose physics as a second major. For my Conceptual Physics or College Physics students my online courses are a password to many professions: teachers, medical and veterinary technicians, physical therapists, medical doctors, nurses and pharmacists. I see how serious and motivated they are dealing with physics as a gateway course to their professional fulfillment.

I am also trying to serve as a role model for those students who want to be physicists. I tell them about the fascinations of my profession, about the ups and downs of a scientific career, about my professor in Poland, Leopold Infeld, who was a long-time collaborator of Albert Einstein at Princeton. I repeat the stories about Einstein which I heard from Infeld and I tell them my own stories about great physicists, Nobel Prize winners, whom I met at conferences and seminars: Oppenheimer, Feynman, Landau, Tamm, Yang, Glashow, Alvarez, McMillan, Ramsay. I tell them about my friend and former collaborator, Professor Chou Kuang-Chao, who later became the President of the Chinese Academy of Sciences. My students can see that physics is something very personal to me, and they see that I am truly offended if somebody tries to voice pseudoscientific ideas under the guise of science.

After a career in pure discovery, I needed to find a fulfillment in **the scholarship of teaching and learning**. I began at first to teach traditionally, as I was taught myself, in regular board-and-chalk lectures. Over the years I was reflecting on my teaching and going through the process of discovering how to teach by continuously developing different approaches. These were: computer-assisted multimedia lecturing; student research projects and research presentations; hybrid and distance courses on the web; peer-instruction teaching; interactive teaching; teaching using extracurricular physics seminars. I was sharing the results of my classroom practice via annual departmental reports and seminars, final reports with conclusions on VCCS, SPS and other grants, presentations at meetings (American Physics Society, American Association of Physics Teachers, the Virginia Academy of Science, VCCS Peer Conferences). Evaluations by students and of students, and evaluations by colleagues and supervisors of my efforts, as well as following my students' careers over 10-15 years after completing my classes at NVCC – all this permitted me to adjust my teaching pedagogy and change it, as needed. I was helped by participation in professional conferences and by studying exemplary educational materials such as “Peer Instruction” (Mazur), “Just-in-Time Teaching” (Novak *et al.*) and other, which kept me current in the theoretical foundations of my teaching practice.

I am using the experience of my research background in **Discovery** in a new way – to develop ideas for student research projects, which then become a discovery in physics for them, and a discovery of this special teaching pedagogy for me. My old paper with Chou Kuang-Chao about muon capture in hydrogen, still cited as one of the first using vector weak interaction of Feynman and Gell-Mann, is now finding a fresh continuation in the work of my students, measuring the half-life of this elementary particle and the flux of cosmic-ray muons. I continue my research interests in electromagnetic multipoles and weak interactions in atoms, follow the literature (subscribe to *Science*, *Nature*, *American Journal of Physics*, *Physics Today*, *Scientific American*, read physics preprints on the web).

My most recent interests are in **Integration** of research in teaching with the practice of teaching. In collaboration with the Physics Education Group of Eric Mazur at Harvard, we developed a grant proposal for the National Science Foundation. Although not funded because of the cuts in the NSF budget, this proposal helped to sharpen my attention to the research-based teaching methods.

Among my main achievements in **Service** to the College and community, I count the creation of the only chapter of the **Society of Physics Students** in all the colleges of the VCCS and its consistent national rating as an outstanding chapter and as the only chapter from a junior college winning research awards from SPS. Another extremely important program which I am proud of helping to launch as one of its Founding Fathers is the **VCCS Professional Development Program**, which is a basis for introducing excellence in teaching at Virginia community colleges.

Teaching physics at a community college is not an easy task. This does not matter though, when after spending hours with a student who could not understand a physical concept, you observe his elated reaction, “Now I see it!” Albert Einstein was right when he said that physics is accessible to everyone. I am one of those who try to help make this a reality.

## ABBREVIATED CURRICULUM VITAE

Walerian Majewski

### EDUCATION

1970 Ph.D. Physics, Institute of Physics, Polish Academy of Sciences, Warsaw, Poland

### EXPERIENCE

1982 – current Northern Virginia Community College (NVCC), Annandale, VA  
Assistant, Associate, Full Professor

2004 Harvard University, Division of Applied Science, Cambridge, MA;  
Thomas Jefferson National Accelerator Facility, Newport News,  
National High Magnetic Field Laboratory, Tallahassee,  
Visiting Scientist

1987/88, 1994/95 George Mason University (GMU), Fairfax, VA, Department of Physics  
Sabbatical Visiting Professor

1981-1982 University of Maryland, College Park, MD, Department of Physics,  
Research Associate

1980-1981 Harvard University, Cambridge, MA, Department of Physics  
Visiting Scholar;  
Brandeis University, Waltham, MA, Visiting Associate

1979-1980 University of Missouri, Columbia, MO, Department of Physics,  
Visiting Professor

1970-1979 Institute of Physics, Polish Academy of Sciences, Warsaw, Poland  
Senior Research Associate

### TEACHING EXPERIENCE SUMMARY

- undergraduate courses: introductory conceptual, algebra- and calculus-based physics; classical mechanics, electromagnetic theory
- graduate courses: quantum mechanics, applied electromagnetic theory
- developed three Web-based hybrid courses
- developed seven online distance learning courses in physics
- developed honors course in physics undergraduate research projects

### RESEARCH PROJECTS IN PHYSICS EDUCATION

These short grant-supported projects were aimed at investigating multimedia instruction, the Internet's educational potential, and the role of research-type activities in teaching freshman/sophomore-level introductory physics courses at a community college.

## GRANT SUPPORT SUMMARY

- Participant in the National Science Foundation-supported software development for nine upper-level undergraduate physics courses – CUPS Project , George Mason University (1995; published by John Wiley and Sons)
- Eight Professional Development Awards from the Virginia Community College System
- Many mini-grants for innovative technology in physics education from NVCC, the NVCC Educational Foundation and the Society of Physics Students
- NVCC-Harvard University NSF grant proposal “Implementation of Research-Based Teaching in Science, Mathematics and Engineering (STEM) Courses for Technology Students at Community Colleges of Virginia”, Advanced Technological Education Program, National Science Foundation, 2005 (submitted, positively recommended by all reviewers, but not funded), Co-Principal Investigator

## ACTIVITIES

- Advisor to the NVCC Chapter of the Society of Physics Students
- Chair for Physics, Virginia State Science and Technology Fair

## HONORS/AWARDS

Research fellowships at the International Institute of Nuclear Physics, Dubna, Russia; International Enrico Fermi School of Physics, Varenna, Italy; International School of Physics, Cargese, France; Summer Institute of Physics, University of Colorado, Boulder, Colorado.

1990	Nominated by NVCC faculty for 1991 SCHEV VA Outstanding Faculty Award
1991	Faculty of the Year, from NVCC Alumni Federation
1992 - 1994	VCCS Chancellor's Commonwealth Professor of Physics Award
1998 - 2007	Advisor to Outstanding Chapter of the Society of Physics Students
1999	NVCC Advisor of the Year Award from the Office of Student Activities
2000	Golden Apple Award from the NVCC Student Government Association
2000	Faculty of the Year, from NVCC Alumni Federation
2000	NVCC Outstanding Service to the College Award, NVCC Educational Foundation
2001	National Outstanding SPS Chapter Advisor Award American Association of Physics Teachers / Society of Physics Students
2001	VCCS Technology in Education TIE Award
2004	NVCC President's Sabbatical Award
2005	Faculty of the Year, from NVCC Alumni Federation
2005 - 2007	VCCS Chancellor's Commonwealth Professor of Physics Award
2007	Twenty Five Years' Service Award, NVCC and the Commonwealth of Virginia
2007	Finalist, 2007 SCHEV Virginia Outstanding Faculty Award

## RECENT RESEARCH INTERESTS

- I. Multipole decomposition of the electromagnetic current
- II. Parity violation tests in atomic physics
- III. Research- based methods of teaching physics

## LETTERS OF SUPPORT

### **Dr. Thomas E. Butler, President, Montgomery College, Conroe, Texas 77384**

I know Dr. Majewski from my years at NVCC as Division Chair, Dean of Students, and Provost. I know him to be a faculty member committed to his discipline of physics, to the furtherance of physics education, and especially to the success of his students. By training and education, Dr. Majewski could surely receive an appointment to teach at the graduate level at the university of his choosing, and of course he has taught at the graduate level. What I remember most of my association with Dr. Majewski is his commitment to our local chapter of the Society of Physics Students. He devoted countless hours to nurturing the development of the club, and to its members. He insisted on high standards for student projects. He challenged the students to aim high. He made the students believe that they could compete successfully with any other students, at any other college – and of course they did. Our chapter was recognized as an Outstanding Chapter, something rather rare for community college chapters, and our students won significant awards, often competing against students at universities. Under Dr. Majewski's tutelage, students were able to transfer to institutions with very strong physics programs. These students came to love physics in the same way that Dr. Majewski does. It is for these characteristics of determination, love of students and his discipline, an unwillingness to accept second rate, and for his ability to motivate students to achieve at the highest level that I recommend Dr. Majewski for Outstanding Faculty of Virginia.

### **Craig M. Jensen, Ph.D., Professor of Physics, Asst. Dean for Physical Sciences, NVCC**

Dr. Majewski is a true leader of the students and inspires them to achieve beyond their expectations. I have taught engineering and physics for several major universities. I have never seen a faculty member that so enjoys and embraces teaching as Dr. Majewski. He sets an outstanding example of how to interact with the students and teach them physics. For that reason, I have incorporated many of his teaching techniques in my own classroom. He exhibits his dedication to the students by holding many study sessions aside from the regularly scheduled class periods and sponsors many students in independent studies receiving no credit from the college for his effort.

### **Maria Dworzecka, Ph.D., Professor, Associate Dean, College of Arts and Sciences, George Mason University, Fairfax, VA**

Both at NVCC and when teaching here at GMU in our Department of Physics, Dr. Majewski demonstrates the true scholarship of teaching and learning. He constantly broadens the range of his teaching methods, learns about progress in research-based teaching and shares his knowledge and experience with others. For twenty five years he maintains a close working relationship between physics at NVCC and GMU. High-quality graduates of his physics classes at NVCC are an important segment of our physics major program. I fully support this nomination for the Outstanding Faculty of Virginia of my former Teaching Assistant from our common Alma Mater - the University of Warsaw in Poland, Dr. Walerian Majewski.

### **Robert Ehrlich, Ph.D., Professor and Chair, Department of Physics and Astronomy, George Mason University, Fairfax, VA**

I have known Dr. Majewski since the time he taught at GMU part-time from 1982 to 1989 while I served as Physics Department Chairman. He also taught full-time during the 1987-88 academic year while on sabbatical from NVCC. I consider Dr. Majewski to be an outstanding scientist and teacher who exhibits the utmost dedication to his students. Most part-time faculty are not very available to students outside of class. In contrast, Dr. Majewski was regularly available and sought out by students. His knowledge for his subject and his ability to communicate it effectively to both beginning and advanced students is on a par with very few faculty I have known. He has always

been given very high ratings by students -- ratings that compare very favorably with the full-time faculty at GMU. Dr. Majewski's use of research projects for students in a Community College setting is both innovative and extremely ambitious. Apparently, it has met with considerable success, given the sizable enrollments in his classes. I enthusiastically support Dr. Majewski for the Outstanding Faculty of Virginia Award.

**Elisabeth Kim, Scientist, Naval Research Laboratory, Washington, DC.**

In the 80s, I took my first undergraduate physics course with Dr. Majewski. He opened my eyes to the world of physics, he opened my brain to new ways of asking questions and seeing the world. And he so peaked my interest in physics, that I actually decided to declare physics my major. I ran into Dr. Majewski again years later. One of my required courses in the physics program at Catholic University was Quantum Mechanics. I took a graduate version of it through the consortium at GMU. It turned out that Dr. Majewski was the professor. Again, I enjoyed the course with him immensely. I worked at NASA's solar physics branch, and currently I work at the Naval Research Laboratory, where I am involved with underwater acoustic research. I can honestly say that I would not be where I am and who I am without Dr. Majewski's influence and encouragement. I would not have even thought of pursuing a degree in physics without him.

**Murray Kopit, Senior Engineer, 3M Corporation, Vancouver; first NVCC-SPS President**

It was my privilege to attend three courses taught by Dr. Majewski between 1990 and 1992. During that time, I was involved in many extracurricular activities which he sponsored. With him, I helped to form the NVCC chapter of the Society of Physics Students, serving as its first president. Our forty members constituted the largest chapter of any two-year college in the country. Dr. Majewski advised and assisted us with some exciting projects, including the construction of a working superconducting motor; the study of the effects of neutron bombardment on a superconducting magnet, and with the construction of a unique experiment to demonstrate the atomic "chirality" or handedness of an atom. In the fifteen years since leaving NVCC, I have carried with me Dr. Majewski's passion for science. I left to attend the University of British Columbia's Engineering Physics program, and have since been employed as an embedded systems engineer with several major corporations in both the United States and Canada. Presently, I am a consultant to the multinational 3M Corporation, serving as a senior engineer at one of their Optical Systems Division labs in Vancouver. I have enjoyed keeping in touch with Dr. Majewski over the years, and am proud to know that he is continuing a legacy of excellent education at NVCC. Outstanding Faculty of Virginia award will be an affirmation and recognition of his past and continuing commitment to his students, to NVCC, and to excellence in science education.

**Robert Doney, PhD, Physical Scientist, US Army Research Lab; second SPS-NVCC president**

After a decade and a half, Professor Majewski still stands out as the most memorable and influential instructor I've encountered. I recently completed research for my Ph.D. in Physics at the University at Buffalo due in no small part to his encouragement and mentorship in my early years and through graduate degrees. Not only were his lectures engaging, but he strongly supported and led efforts to establish a very large and active Society of Physics Students that continues to flourish at NVCC. He listened to a vast array of crazy ideas and thoughts that most physics students have, but rather than pushing them aside he would encourage the creativity by helping us to think more like physicists: why this might be a better way to consider the problem, how would you validate your theory experimentally, etc. Further, he opened up several research classes that was quite cutting edge for students at such an early point in their educational curriculum. This level of activity and personal involvement with the students outshined any such mentorship I witnessed up to that of my Ph.D. advisor. In considering that

after such a long period of time, I still recall the many events that had a dramatic and positive impact on my professional development.

**Maurice Piller Jr., M.S., Scientist, Spallation Neutron Source, Oak Ridge National Laboratory, TN**

I received my ASEE degree from NVCC in 1992. While I was an engineering student at NVCC I became involved in the Society of Physics Students (SPS), an extra-curricular program sponsored by Dr. Majewski. We applied for and received a grant to build a superconducting heat engine and I was part of a team of SPS students that traveled to Washington, DC where we presented our research at a session of the American Physical Society. This was amazing stuff for me as a sophomore engineering student at the time. Dr. Majewski has had a great impact on my career path. While at NVCC Dr. Majewski encouraged his students to apply for science-related internship programs. With support from Dr. Majewski I applied for and was accepted into a summer internship position at the T. Jefferson National Accelerator Laboratory. Following graduation from Virginia Tech, I went back to Jefferson Lab where I worked for several years. Dr. Majewski is a very special teacher who puts his gifts of passion, energy, enthusiasm, and ability to work for the benefit of us all.

**Jarek Tuszyński, Ph.D., Scientist, Science Applications Intern. Corp., Fairfax, VA**

The most memorable of my classes at NVCC were classes of Dr. Majewski, as well as his honors classes, for which we would research selected topic and then present it to the rest of the group. That was the way I was first introduced to the chaos theory, on which I did more work later on. I would like to express my support for nominating Dr. Majewski in recognition for the fine job he does and his effort to make physics exciting for students.

**Cos Renzi, Ed. D., Former Principal, Timber Lane Elementary School, Falls Church, VA**

Dr. Majewski has involved his honor physics students with our students for a number of years. The NVCC students worked with our English as Second Language (ESL) students, helping them with their science projects. Many from our school do not see a college education as a possibility in their future. This interaction shows our students that it can be a possibility for them, for they see that individuals such as themselves are in fact taking advantage of the opportunities provided by the community college.

**Don Jernigan, NVCC and Old Dominion U. student, NVCC SPS President 2004-2005.**

I personally have been inspired by Dr. Majewski and have taken both his honors project course and his Modern Physics course despite not needing them for my chosen degree program. Dr. Majewski has led SPS to receive a number of prestigious awards in the past, giving our SPS Chapter national recognition. Dr. Majewski himself has received the American Association of Physics Teachers and the Society of Physics Students award of the Outstanding SPS Chapter Advisor in 2002. That was the first and only time that a community college advisor has ever won this prestigious national title. SPS-NVCC is happy to see our Advisor nominated for the Outstanding Faculty of Virginia Award.

- **Abigail Clark and Samuel Clark, former NVCC students, currently at MIT**

It is extremely uncommon to find a faculty advisor like Dr. Majewski. He was involved with the students and excited about the subject of physics. In the spring of 2005 we enrolled in Dr. Majewski's Honors Physics Project course PHY 298. Upon completion of the Muon project, Dr. Majewski helped us to prepare a PowerPoint presentation and present it at the Physics Society Zone meeting at Bridgewater College, VA. In the fall of 2005 we arrived at MIT as full time students. We are confident with the background we have in physics from working with him, and we feel well prepared for the tasks ahead.

## ADDITIONAL DOCUMENTATION

Job performance of Dr. Majewski was rated as Excellent at least in the last 7 years. As an example:

### **Report on the Evaluation of Faculty Personnel at NVCC, Jan. 2006 to Jan. 2007**

Dr. Majewski has had a productive year teaching, serving as an advisor, and mentoring research projects for his physics students. He has offered PHY 231/232 as a web-based hybrid course which has provided more flexibility to students who wish to take calculus-based physics. His teaching and student evaluations are excellent. Student comments such as "the witty explanations of why physics works", "it was fun", "instructor was patient and accommodating of student needs", "online homework was interesting and accurate" support Dr. Majewski's teaching excellence. He is expecting to increase the ELI online offerings in Physics. He was awarded a VCCS Chancellor's Commonwealth Professors Award for 2005-2007. He continues in a strong leadership serving as advisor to the Society of Physics Students.

### **NVCC student responses to questions about Dr. Majewski on the evaluation form**

- **Attitude and willingness to help students**

"He likes his subject."

"His determination to help you succeed."

"Has skill in explaining difficult subjects and making them seem easy."

"Has open-minded, investigative approach to presenting material. Has respect for students' intellect and curiosity. "

"He makes the class enjoyable."

- **Would you recommend this instructor as a teacher of this course?**

"Yes, incredible teacher. Knows everything. It's been fun."

"Yes. He shows enthusiasm toward the subject and encourages students with his energy. "

"His interest in the subject shows in his lectures. He makes the course material interesting."

- **What do you like best about your instructor?**

"Nice, enthusiastic, genius, one who inspires thinking."

"He really seems to enjoy teaching. "

"Knowledge, interest in subject and students and a sense of humor."

"The immense knowledge of physics."

"He knows the subject in depth. He is one of the best instructors I have ever met."

"Enthusiasm and desire to share his knowledge. Also takes time to be concerned about individual students."

"His lectures were clear, original (not just repetition of book), and interesting. His grading system is fair. His tests were challenging yet attainable."

"His enthusiasm and knowledge are contagious (well, at least the enthusiasm). Dr Majewski makes me appreciate and enjoy physics. I consider myself very lucky to have him as an instructor."

"Instructor was patient and accommodating of student needs, explaining well, presenting problems on the board in a highly methodical fashion."

"The online homework was interesting and accurate. The in-class problem solving was very helpful."

**Instructor Evaluations by Students, G. Mason University Course PHYS 350 University Physics II July 20, 1989 (the only records preserved until now, the later ones were similar but are lost); Walerian Majewski**

Historical distribution of means established from **127** sections of classes from 12 semesters

Total student tally sheets tallied in distribution of means: **1946**

**Overall average for 6 comments: Majewski – 3.92; GMU professors – 3.76.**

**Instructor Evaluations, G. Mason University, Course PHYS 402 Introduction to Atomic Physics and Quantum Mechanics, January 20, 1989; Walerian Majewski**

Historical distribution of means established from **76** sections of classes

Total student tally sheets tallied in distribution of means: **477**

**Overall average for 6 comments: Majewski – 4.26, GMU faculty – 4.24**

**Transfer of Dr. Majewski students from NVCC to four-year Institutions and their careers**

- **Daniel Gordon, junior, Physics Major at Amherst College, MA**

I think both the knowledge and confidence I gained in Dr. Majewski's classes were instrumental in my gaining admission to competitive four-year colleges. And while I find the study of physics exceedingly challenging at Amherst College, my knowledge and skills have allowed me to be competitive among the brightest and best prepared students. Dr. Majewski challenged and encouraged me in my study of physics and totally supported me in my efforts to transfer in 2007 to a four-year college. I am very grateful for having had the opportunity to study under him.

**Excerpts from e-mails**

- **Jonathan Graf, PhD candidate, Res. Engineer, Luna Innovations, Blacksburg, VA**

I was a student of yours in University Physics 1 & 2 in the Fall of 1997 and Spring of 1998. In Spring of 98, you gave me the NVCC Excellence in Physics award. Before I transferred to Virginia Tech, you told me to keep up with you, so I thought I'd write and let you know what I'm up to.

I graduated Magna Cum Laude with my B.S. in Computer Engineering in May, 2002.

I finished my M.S. in Computer Engineering on June 18, 2004 with a successful defense of my thesis, "A Key Management Architecture for Securing Off-Chip Data Transfers on an FPGA." It is related to computer security.

I'm continuing my research related to the same technology as a Research Engineer at Luna Innovations in Blacksburg, VA. I'm leading a project of my own, having coordinated a team of Luna and NASA scientists to develop a novel biometric security method.

**I mention these things to let you know that the education you give students at NVCC is more than adequate to prepare them for a great future at universities and in industry. Your physics classes were both a challenge and a source of inspiration for me. I hope you might pass some of this information along to current NVCC students to encourage them that they can do anything they want to if they work hard and apply themselves at NVCC.**

Luna has a generous tuition reimbursement plan, and I am considering taking advantage of it to pursue a Ph.D. at Virginia Tech. Any advice here? Thanks for thinking of me -- keep me up to date about how things are going there at NVCC.

- **Pooya Azar, Senior in Civil Engineering at VPI**

I was accepted for the fall semester 2006 and got permission to start in the second summer session, just to get a head start. This is truly an academic environment and as much as I never thought I would someday be saying this; **"I could not think of another place I would want to be, or another thing I would like to do, which would give me the same joy and satisfaction"**. The civil engineering program here at Tech is absolutely exceptional in all aspects but mostly the close bond formed between the faculty and students.

I don't believe I have ever officially thanked you for nominating me for the national dean's list but here **I would like to mention the great impact of your action on my academic and professional career**. As the result of my membership, I will have almost a full scholarship starting fall of 2007 as well as the academic prestige that will follow it.

- **Brian Weston, MS candidate in Management in IT at UVA, Senior Systems Analyst at Detica DFI in Washington, DC**

I just (2007) have graduated at VPI with a degree in Computer Science with summa cum lauda and as a Commonwealth Scholar. I earned a GPA of 3.74 and ranked within the top 15% of the entire school. Not too bad for an older student and **I showed them what NVCC transfer students can do.** -;) I had also applied and was accepted at the University of Virginia McIntire School of Commerce to pursue a Master of Science in Management of Information Technology. This degree was intended to complement of my bachelors and together would provide me with the right skills to be a functional IT project manager. Currently, I am employed at Detica DFI in Washington, DC working on several DHS government systems. Looking back, I greatly appreciate the cross exposure that I had in physics, chemistry, math and the various fields in computer science.

### **Voice of a Parent**

Dr. Barbara Saperstone, Provost, Annandale Campus, NVCC  
Dear Dr. Saperstone,

You already know of Dr. Majewski's considerable contributions to the college, but I wanted to communicate to you our appreciation for both his excellent teaching and his unparalleled support for his students.

Our son, Daniel, took two of his courses, an introductory physics course and an honors seminar which provided students the opportunity to conduct research in physics. Both were excellent courses, Daniel was also a member of the Society of Physics Students, a group which Dr. Majewski advises. Dean of Student Development at NVCC-Annandale Dr. John Thrash described Dr. Majewski as "brilliant" in a conversation with me earlier this spring, expressing gratitude that Dr. Majewski is on the NVCC faculty. I couldn't concur more. Dr. Majewski's

enthusiasm for physics is contagious. He encourages his students by sponsoring one of the most active collegiate chapters of the Society of Physics Students. The Society has brought physicists and professors to NVCC to speak and has helped students receive grants to conduct their research. Dr. Majewski has also encouraged students to present their research at other collegiate forums. I think it must be highly unusual that a junior college chapter would be so active. Dr. Majewski is the sole faculty member responsible for the group's success.

Dr. Majewski encouraged Daniel at every step of his education at NVCC and provided support and recommendations for his applications to transfer to a highly competitive four-year college. He took a personal interest in Daniel's goals and supported and encouraged his aspirations, taking the time to make sure Daniel was recognized for his achievements at the college. His support has been particularly important to Daniel, who decided that he wanted to major in physics. Last spring (2007) he was accepted at Amherst College. He is studying there now, holding his own among highly qualified peers from schools around the world.

A faculty member like Dr. Majewski is indispensable. He not only knows and teaches his subject well, but engages and supports his students in every possible way. I would hope that NVCC has a way of recognizing outstanding faculty members like Dr. Majewski. He has our family's sincere gratitude.

Sincerely,

Cheryl Gordon, 3436 Lyrac Street, Oakton, VA 22124

#### Life Story of **Nha-Khan Le**

Jan, 16, 1991

"To: Admissions Department, George Washington University, Washington, DC

I am recommending my student Nha-Khan Le for transfer from NVCC to your premedical program. She was absolutely the best student in several of my physics classes. Extremely motivated to learn, very bright, hard worker, highly concentrated on her educational goals. She is a recent immigrant from Vietnam; her family has escaped from there as a part of a Boat People flow, but Khan was captured and put in jail (at the age of 16!) for a few months. She tried to escape two more times. Finally, in 1988, she was able to escape on a small boat and after seven days in the open ocean to land in a refugee camp in Malaysia. In 1990 she was reunited with her family in Northern Virginia. After so many trials this mature, responsible, strong person and a student of great promise deserves all the support from our society.

Walerian Majewski, Physics, NVCC"

October 2007, **16 YEARS LATER:**

Nha-Khan Le, MD

Practice Address: 2041 Georgia Ave, NW, Suite 3200 Washington, DC 20060, phone: 202-865-4164

Medical School: George Washington University, 1998

Residency: Howard University Hospital, Washington, DC