PASSIONS OF DISCOVERING, LEARNING, AND SHARING

(Speech at the Celebrating Pedagogy Conversation Panel-X, October 1, 2007)

Vladimir V. Riabov, Ph.D.*
Associate Professor, Department of Mathematics & Computer Science, Rivier College

My academic philosophy, which has been inspired by many philosophers, could be expressed as the following:

- Three passions guide my life: the ecstasy of discovery, the search for knowledge, and the striving for sharing it with my students and global community.
- Curiosity and novelty bring me the greatest ecstasy that governs me in a discovery endeavor.
- The search for knowledge helps me stay at the cutting edge of science and technology.
- Both discovery and knowledge lead me to my teaching mission of sharing knowledge and expertise, which is reflected in the endeavors of my students and everyone who accepts the challenges of these passions.

Since January 1999, I teach at Rivier College courses in Computer Science, Mathematics, and Information Technologies for graduate and undergraduate (evening) students, who come here to take classes after long workings hours or from abroad. I have a great respect to these students, because I was "in their shoes" after immigrating to the United States from Russia fifteen years ago and receiving my second Master degree in Computer Information Systems from Southern New Hampshire University (in addition to my Ph.D. in Applied Mathematics & Physics). Like them, taking classes at SNHU, I worked at Newbridge Networks Inc. and taught courses at Daniel Webster College. My students have not only survival skills, but also the striving for new knowledge and professional skills. This tune helps us establish a rapport that will last forever.

I have described my teaching credo in several publications and presentations [1-20]. My teaching methods [1, 4, 15-18] are based on several techniques [1-14] that challenge and motivate students to become passionate in their studies and be active in the classroom. Starting every class with small challenging exercises [1, 2, 7], I encourage students to select and develop their own projects. I demonstrate to them the best achievements of professionals in the related fields of expertise [21-25], the best projects of students (available on the instructor's Website, http://faculty.rivier.edy/vriabov/), who took the similar courses in the past, and the challenges of the discipline [8, 21].

This presentation demonstrates the advantages of using the project-based approach [1, 4] in the course delivery that motivates students in studying and learning modern networking technologies and software engineering methods [2-9]. The "warm-up" exercises [1], discussions of recent research publications, lectures, field trips [7], and labs [1, 4] stimulate students in selecting topics for their overviews of the technologies and for research projects, and provide them with knowledge, instructions, and hands-on experience. The students, who accept the challenges of innovations in networking and software engineering areas, achieve the summits through delivering their presentations at national and international conferences [26, 27], publishing their first articles in professional journals [28-38], and promoting their findings among college peers and colleagues in companies and organizations [39-43].

Starting the studies in my CS120E Introduction to Computing, MA100E Mathematics-I, and MA210E Linear Algebra courses, the students learn basics but strive for complex and innovative summits in the fields

ISSN 1559-9388 (online version), ISSN 1559-9396 (CD-ROM version).

of computer science and applied mathematics [2]. I spend extra time with adult students and freshmen, who have demonstrated weak mathematical or computing skills, providing them with advising and tutoring. I believe I have established a rapport and mutual respect with all of my students. Together with other faculty members of the department of Mathematics and Computer Science, I provide various services to all students, such as advising, computer hands-on training, online instructions via the Blackboard®, quick responses and help in resolving their problems, patience and personal integrity in evaluation, references, and assessment.

The students are introduced to the state-of-the-arts software and offered hands-on training in computer labs. In particular, freshmen and juniors have developed their first individual computer programs by using the Jython® (Java-based) software tool and Microsoft® Visual Studio for C++ programming. Seniors and graduate students have become proficient in using the ArgoUML®, Visual Paradigm® For UML, IBM/Rational Software Development Suite®, McCabe IQ®, VIOLET®, ARENA®, Visible Analyst®, and OPNET® IT GURU software tools for developing sophisticated software systems and for analyzing complex networking systems. Also, Dr. Sabin and I have promoted the installation of the MATLAB® software tools that are available for all students and faculty at Rivier College.

All of the courses that I teach in the Computer Science programs are project-based. I instruct the students to work in teams that help them develop group projects at high level of professional competence. In CS552A/CS405E Object-Oriented System Analysis & Design, CS608A/CS405E Software Engineering, and CS690A/CS450E System Simulation & Modeling classes, students are involved in teamwork projects that encourage them to develop important social skills and values through cooperation, collaboration, honesty, support of the team members, team presentations, and the sharing of mutual responsibilities. Many multicultural issues have been successfully resolved in discussions between international and American students, when they work together on projects, in the classroom, and in computer labs.

Being a researcher myself, I encourage students to develop their individual research projects in various cross-listed courses (e.g., CS553A/CS445E/CS308E Introduction to Networking Technologies and CS5758/CS575A/CS445E/CS308E Advanced Networks) and in the CS699A Professional Computer Science Seminar, where every graduate student works on his/her final capstone project in the M.S./CS and M.S./CIS/ITM programs. This individual research-based project approach helps the students in developing their important values of integrity and perseverance. I use the method of *critical thinking* in my teaching practice and delivery of these values. The method is based on independent research approach, challenging questions, searching for non-trivial solutions, fair discussions, and respect for different opinions through an overview and reflections on opposite arguments. This method of *encouraging students to go an extra mile and challenge the opportunities* helps them in building-up the faith in their abilities and leadership qualities, which are in the great demand by the society (industry, business, government, and community) nowadays.

Twice a year, seniors and all graduate students deliver publicly their presentations on individual and team projects in the classroom and seminars [41-43]. As an instructor, I help them in organizing presentations and in developing skills of public speaking.

I consider ethics and social justice as a vital component of my teaching practices for students. I convey this message to my students at Rivier College in the various ways. I encourage my students in the CS552A/CS405E Object-Oriented Design, CS608A/CS405E Software Engineering, CS690A/ CS450E System Simulation & Modeling, and CS699A/CS450E Professional Computer Science Seminar classes to develop individual and team projects that can be used in the companies and serve the community [41-43]. The projects accumulate interdisciplinary experience of the students, and demonstrate their personal responsibility for the profession and the society. Some students' projects become significant contributions for helping people with disabilities. For example:

- Keith Fryklund, (2006-2007) “Nashua Soup Kitchen and Shelter Database” (private domain software and database for the Soup Kitchen and Shelter Organization in Nashua, NH).

- Xiaoling Zhu, (2005) "A New Chat System" (public domain software for persons with disabilities).
- Vaishali Pujuri, (2004) "Speech Synthesis Using Java Speech API" (public domain software for persons with disabilities).
- Christopher Baker, (2003) "Photo Editor for Medical Images" (for Catholic Medical Center Hospital, Manchester, NH);
- Thomas Palmer, (2003) "HEART II System Monitor for Pocket PC-2002" (for medical hospitals).
- Cristian Cocheci, (2002) "A Recorder/Playback Testing Tool for Capturing User Interactions with Software GUIs" (public domain software for supporting user interfaces).
- Yuanping Chen, (2002) "Automatic Voice Response Bill Payment System" (for persons with disabilities).

Our in-class and online discussions of various environmental issues (e.g., "Environment in Human-Centered Systems," "Engineering the Ocean," "How Biology Became an Information System," and "Environments Become Smart") reflect social and moral consciousness of my students.

I cultivate in the student the sense of being a scholar, and of Rivier being a community of scholars. Since the age of fifteen, I have been striving to be a scholar myself. I have published four chapters for the Internet Encyclopedia, the Handbook of Computer Networks, and the Handbook of Information Security [22-25] and about 100 articles and papers in leading research journals and conference proceedings since 1976 to present.

During my period at Rivier College since 1999, I participated in numerous international, national, regional and local conferences, including three Congresses of International Council of Aeronautical Sciences, three International Symposia on Rarefied Gas Dynamics and Shock Waves, four International Conferences of the American Institute of Aeronautics and Astronautics, three conferences of Massachusetts Institute of Technology, and others. Therefore, it is natural for me to encourage my students to pursue scholarly activities and share their findings with global research community. I support the intellectual growth of the students in the following ways:

a) As a co-founder and the Editor-in-Chief of the *Rivier Academic Journal*, I encourage my students to submit summaries of their projects to the *Journal*. Ten graduates (David Snogles, Martin Milkovich, Ajay Kumar, John Dion, David Dwyer, Bruce Trull, Vandana Wekhande, Jamie Anderson, Arti Sood, and Robert Zupko) have published recently their manuscripts in the *Rivier Academic Journal* [28-38] and other publications [26, 27]. Students from other departments have also published their first research papers, poems, fiction stories, project papers, illustrations, and photographs in this academic journal since fall 2005.

b) Since November 2002, I direct the Rivier College Mathematics & Computer Science Lecture Series [39, 40]. I encourage my students to attend these lectures, and they get extra credit points for attending. I asked my former graduate students, David Dwyer and David Norman, to present at the Lecture Series and share their scholar experience at the companies with our undergraduate and graduate students. In April 2005, I also presented at the Lecture Series my research on Applications of the Structured Testing Methodology for Computer-Code Complexity Analysis. (Later, these findings were presented and published in the proceedings of the International Conference on Computer Science and Information Systems, held in Athens, Greece, June 15-17, 2005 [8] and the NEQC 56th Conference of New England Quality Council, held in Mansfield, MA, October 17-18, 2006 [6]. The Vice President of the McCabe Software Inc., who had read these publications, donated recently the McCabe IQ® software tool [that costs $108,000] to Rivier College for promoting research efforts among computer-science majors).

c) Since August 1999, I direct the Professional Seminar in Computer Science [41-43]. All my graduate students from the CS699/CS450 class present publicly at the Seminar the results of their individual final projects in the M.S./CS/CIS/ITM and B.S./CS/IT programs.

d) In the CS552A/CS405E Object-Oriented System Analysis & Design, CS608A/CS405E Software Engineering, and CS690A/CS450E System Simulation & Modeling courses, I encourage my students to conduct research and develop team projects related to the needs of companies and community. I supervise their team research projects.

e) In the CS553A/CS445E/CS308E Introduction to Networking Technologies and CS575A/CS578A Advanced Networks classes, I encourage my students to conduct research and write project papers on modern networking technologies [30, 31, 33, 36-38]. I supervise their individual research projects.

f) In addition to the final capstone individual project in the CS699A/CS450E Professional Computer Science Seminar, I encourage graduate students to conduct research on the state-of-the-art modern computing technologies and present the research results publicly twice by each student individually [26-29, 32, 34, 35]. I supervise their research on the selected topics.

g) I supervised the project on digital video clusters developed by Martin Milkovich for the CS690A and CS699A classes [26, 29]. Martin worked very hard on his project offering a new software tool, OMneT++, for modeling and simulating performances of the clusters. (I recommended this tool for using by other graduates in developing their projects on networking systems). He delivered a presentation on his findings at the Winter-2005 International Conference on Simulation Methods held in Orlando, Florida. Martin continues his studies in the Ph.D. program at M.I.T.

h) As a member of the College-wide Assessment Committee, I wrote an Open Statement on Teaching, Learning, and Assessment activities that would develop a *stronger bond* between teachers and students on our campus (the Statement was distributed by the Committee among faculty, students, alumni, administrators, and staff in AY2002-2003).

i) Being an active member of many professional organizations, I encourage students and faculty to become members of the organizations, such as the Association for Computing Machinery (ACM), the Institute of Electrical and Electronics Engineers (IEEE), the IEEE Computer Society, the Mathematical Association of America (MAA), and the Software Association of New Hampshire (SwANH). It is an interesting fact that I have become a member of the SwANH after my graduate student, Lee A. Newcomb, invited me to participate in the Annual Meeting of this organization in October 2001. I cherish this rapport between my students and me that will last forever.

REFERENCES

[1] Riabov, V. Challenging Projects and Virtual Labs in Web-enhanced Networking Technology Classes. *The Journal of Computing Sciences in Colleges*, Vol. 21, No. 6, June 2006, pp. 88-99.

[2] Riabov, V. and Anderson, J. Motivational Study Cases for the Introductory Mathematics Course in Colleges. *The Rivier Academic Journal*, Vol. 2, No. 2, Fall 2006. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[3] Riabov, V. Exploring Singular Differential Equations with Exponential Box-Scheme. *Proceedings of the 19th Annual International Conference on Technology in Collegiate Mathematics* (Boston, MA, February 15-18, 2007), Boston, MA, Prentice-Hall, 2007, pp. 1-6.

[4] Riabov, V. OPNET Labs and Student Research Projects in Online IT Classes. Presented at the 10th Advanced Telecommunications Systems Workshop of the National Center for Telecommunication Technologies, Marlborough,

MA, July 10-12, 2007.

[5] Riabov, V. Graph Theory Applications in Developing Software Test Strategies for Networking Systems. *The Rivier Academic Journal*, Vol. 3, No. 1, Spring 2007. Retrieved Oct. 1, 2007, from http://www.rivier.edu/journal/.

[6] Riabov, V. The Structured Testing Methodology for Software Quality Analyses of Networking Systems. *Proceedings of the NEQC 56th Conference of New England Quality Council* (Mansfield, MA, October 17-18, 2006), Paper 13D, American Society for Quality, 2006.

[7] Sabin, M., Higgs, B., Riabov, V., and Moreiro, A. Designing and Running a Pre-College Computing Course, *The Journal of Computing Sciences in Colleges*, Vol. 20, No. 5, May 2005, pp. 176-187.

[8] Riabov, V. Networking Software Studies with the Structured Testing Methodology. *Computer Science and Information Systems*, edited by P. Petratos and D. Michalopoulos, Athens Institute for Education and Research, Athens, Greece, 2005, pp. 261-276.

[9] Riabov, V. Three Fast Computational Approximation Methods in Hypersonic Aerothermodynamics. *Proceedings of the Third M.I.T. Conference on Computational Fluid and Solid Mechanics*, June 13-14, 2005, edited by K. J. Bathe, Vol. 1, Elsevier, Boston, MA, 2005, pp. 819-823.

[10] Riabov, V. Applications of Exponential Box Schemes for Viscous Flows with Combustion and Blowing. *Computational Fluid and Solid Mechanics. Proceedings of the Second M.I.T. Conference on Computational Fluid and Solid Mechanics*, June 17-20, 2003, edited by K. J. Bathe, Vol. 1, Elsevier, Boston, 2003, pp. 1102-1105.

[11] Riabov, V. Unexpected Effects in Transitional Continuum-to-Vacuum Media. Presented at the Rivier College Faculty Lecture Series, Rivier College, Nashua, NH, September 17, 2003.

[12] Riabov, V. Internet Technology and Confidentiality. Presented at the Panel Discussion, "Confidentiality on the Internet", Rivier College, Nashua, NH, April 21, 2003.

[13] Riabov, V. Simulation Techniques in Hypersonic Aerodynamics. *Proceedings of the 23rd Congress of the International Council of the Aeronautical Sciences*, Paper 181, Toronto, Canada, 2002.

[14] Riabov, V. Computational and Analytical Methods in the Aircraft Design Curriculum. *Proceedings of the 23rd Congress of the International Council of the Aeronautical Sciences*, Paper 255p, Toronto, Canada, 2002.

[15] Riabov, V. Challenge in the Aerospace University Classroom. *AIAA Paper*, No. 2000-0802, American Institute of Aeronautics and Astronautics, January 2000, pp. 1-9.

[16] Riabov, V. New Challenges for Aerospace Education Programs in American and Russian Universities. *AIAA Paper*, No. 2000-0528, American Institute of Aeronautics and Astronautics, January 2000, pp. 1-7.

[17] Riabov, V. (Invited Lecturer). Challenge in the Computer Science Classroom. Presented at the W.P.I. Computer Science Lecture Series, Worcester, MA, January 1999.

[18] Riabov, V. Comparative Analysis of Aerospace Education Programs in American and Russian Universities. *Proceedings of the Mechanical Engineering Department Heads Conference*, American Society of Mechanical Engineers, San Diego, March 1997, pp. 39-42.

[19] Riabov, V. Guest on the BBC Educational Program "The Open University goes to Russia," London, UK, Nov. 1991.

[20] Riabov, V. Interview to the BBC TV News on partnership between The Open University of Great Britain and Russia, London, UK, November 1991.

[21] Sheldon, T., *McGraw-Hill's Encyclopedia of Networking and Telecommunications*, *2nd ed.*, McGraw-Hill (2001).

[22] Riabov, V. Storage Area Networks. *The Internet Encyclopedia*, Vol. 3, Wiley & Sons (2004), pp. 329-339.

[23] Riabov, V. Simple Mail Transfer Protocol (SMTP). In *The Handbook of Information Security: Key Concepts, Infrastructures, Standards and Protocols*, Vol. 1, Wiley & Sons (2006), pp. 878-900.

[24] "Storage Area Networks Fundamentals," The Handbook of Computer Networks, Vol. 3, edited by H. Bidgoli, John Wiley & Sons Publishing Company, New York, September 2007.

[25] "SMTP: Simple Mail Transfer Protocol," The Handbook of Computer Networks, Vol. 2, edited by H. Bidgoli, John Wiley & Sons Publishing Company, New York, September 2007.

[26] Milkovits, M. N. Digital Video Cluster Simulation. In *Proceedings of the 2005 Winter Simulation Conference, M.E. Kuhl, N.M. Steiger, F. B. Armstrong and J. A. Joines, eds.* (Orlando, Florida, December 2005), pp. 2400-2406.

[27] Dwyer, D., and Cahill, J. Hardware Reliability Growth Estimations and Projections – What is Valid and What is Not. *Proceedings of the NEQC 56th Conference of New England Quality Council* (Mansfield, MA, October 17-18, 2006), Paper 24D, American Society for Quality, 2006.

[28] Snogles, D. Personal Encrypted Talk - Securing Instant Messaging with a Java Application. *The Rivier Academic Journal*, Vol. 1, No. 1, Fall 2005. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[29] Milkovich, M. Using OMNeT++ to Simulate a Heterogeneous Digital Video Cluster Fabric. *The Rivier Academic Journal*, Vol. 1, No. 1, Fall 2005. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[30] Kumar, A. Development of Laboratory Exercises Based On OPNET IT Guru Academic Version. *The Rivier Academic Journal*, Vol. 1, No. 1, Fall 2005. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[31] Kumar, A. An Overview of Voice over IP. *The Rivier Academic Journal*, Vol. 2, No. 1, Spring 2006. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[32] Dwyer, D. Software Reliability Estimations/Projections, Cumulative and Instantaneous. *The Rivier Academic Journal*, Vol. 2, No. 1, Spring 2006. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[33] Trull, B. An Overview of Broadband over Power Line. *The Rivier Academic Journal*, Vol. 2, No. 1, Spring 2006.

[34] Dion, J. Automated Music Composition: An Expert Systems Approach. *The Rivier Academic Journal*, Vol. 2, No. 1, Spring 2006. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[35] Dion, J. Musician Web-service Using Ruby-on-Rails, SOAP, FLEX, and AJAX. *The Rivier Academic Journal*, Vol. 2, No. 2, Fall 2006. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[36] Wekhande, V. Wi-Fi Technology: Security Issues. *The Rivier Academic Journal*, Vol. 2, No. 2, Fall 2006. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[37] Sood, A. Network Design by Using OPNET™ IT Guru Academic Edition Software. *The Rivier Academic Journal*, Vol. 3, No. 1, Spring 2007. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[38] Zupko, R. J. Introduction to the IEEE 802.16 Standard: Wireless Broadband Access. *The Rivier Academic Journal*, Vol. 3, No. 1, Spring 2007. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[39] Riabov, V. Mathematics and Computer Science Lecture Series (2002 – 2005). *The Rivier Academic Journal*, Vol. 1, No. 1, Fall 2005. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[40] Riabov, V. Mathematics and Computer Science Lecture Series (2006). *The Rivier Academic Journal*, Vol. 2, No. 1, Spring 2006. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[41] Riabov, V. Professional Seminar in Computer Science (Spring 2005). *The Rivier Academic Journal*, Vol. 1, No. 1, Fall 2005. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[42] Riabov, V. Professional Seminar in Computer Science (Spring 2006). *The Rivier Academic Journal*, Vol. 2, No. 1, Spring 2006. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

[43] Riabov, V. Professional Seminar in Computer Science (Spring 2007). *The Rivier Academic Journal*, Vol. 3, No. 1, Spring 2007. Retrieved October 1, 2007, from http://www.rivier.edu/journal/.

---

* **Dr. VLADIMIR V. RIABOV**, Associate Professor of Computer Science at Rivier College, teaches Introduction to Computing, Networking Technologies, Software Engineering, Object-Oriented System Design, System Simulation and Modeling, and Professional Seminar in Computer Science. He received a Ph.D. in Applied Mathematics and Physics from Moscow Institute of Physics and Technology and M.S. in Computer Information Systems from Southern New Hampshire University. Vladimir published about 100 articles in encyclopedias, handbooks, journals, and international and national conference proceedings, including *The Internet Encyclopedia*, *The Handbook of Information Technologies*, *The Handbook of Computer Networks, Journal of Spacecraft and Rockets*, *Journal of Aircraft*, *Journal of Thermophysics and Heat Transfer*, *Proceedings of International Congress of Aeronautical Sciences*, *International Symposia on Rarefied Gas Dynamics and Shock Waves*, *International Conferences on Computer Science and Information Systems*, *Conferences of American Institute of Aeronautics and Astronautics*, and others. He is a member of ACM, AIAA, IEEE, and MAA.