

CURRICULUM VITÆ — RICHARD FREDERICK DRUSHEL

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1. Brief Biography.

Born: 3 November 1962, in Cambridge, OH, USA.

Current Occupation: Instructor and Executive Officer, Department of Biology, Case Western Reserve University (CWRU), Cleveland, OH 44106-7080.

Duties: Undergraduate teaching (anatomy with labs, physiology, senior capstones), including maintaining the Anatomy/Physiology Resource Room (currently Millis 320A); undergraduate advising (Biology majors and minors); oversight of Biology facilities (direct liaison with Facilities, on-call 24/7 for emergencies) and undergraduate education (member of the Biology Curriculum Committee 2006–date, Chair 2009–2010; member of the Undergraduate Affairs Committee, 2014–date), supervision of the Lab Coordinator (Ms. Binh To-Thorne); maintenance of Biology course roster in the PeopleSoft Student Information System (SIS) and in the online University Bulletin (CourseLeaf). As Executive Officer, I report directly to the Chair of Biology, and am a liaison between the Chair and faculty, staff, and students; I prepare a written status report for monthly faculty meetings. I am also the Academic Representative for Biology (2006–date), responsible for approving all transfer and off-campus study credits. I serve as backup for the Undergraduate Coordinator (currently Ms. Katie Bingman); prior to Fall 2012, those duties were part of the Executive Officer position.

Other: I am the Faculty Advisor for two campus organizations: Beta Nu Chapter, Theta Chi Fraternity (since Fall 1998) and the CWRU Film Society (since Fall 2002). I have been widely recognized by students for my teaching and advising activities, including: five nominations for the Carl F. Wittke Award (teaching), one nomination for the J. Bruce Jackson Award (mentoring), twice winner/one nomination for Outstanding Faculty Advisor, winner of the Robert Niebaum Award (Outstanding Greek Chapter Advisor).

2. Education.

- 1987–1992: Graduate student, Department of Biology, CWRU. Thesis advisor: Dr. Arnold I. Caplan. Thesis research: ultrastructure and immunohistochemistry of embryonic chick muscle proteoglycans; 3-dimensional anatomical reconstruction of embryonic chick leg muscle; basement membrane formation in *in vitro* muscle culture systems. Awarded Ph.D. degree in Biology, 15 January 1993. Dissertation entitled: “Anatomical and Extracellular Matrix Development of Embryonic Chick Leg Muscle *In Vivo* and *In Vitro*.”
- 1984–1986: School of Medicine, CWRU. Withdrew at the end of the 2nd year for personal and financial reasons.
- 1980–1984: Undergraduate, CWRU. Major: Biology. Minor: Chemistry. Undergraduate research in the laboratory of Dr. Arnold I. Caplan (1983–1984), studying vascular and extravascular fluid dynamics in embryonic chick wing development, leading to an Honors Thesis. Awarded B.A. degree in Biology, *summa cum laude* with Honors in Biology, 20 May 1984.
- 1976–1980: Liberty High School, 1 Leopard Way, Youngstown, OH 44505. Graduated as Salutatorian, diploma awarded 8 June 1980.

3. Employment History.

- 2006–date: Instructor and Executive Officer, Department of Biology, CWRU. Courses taught: BIOL 119/121 (Concepts for a Molecular View of Biology I/II), BIOL 223 (Vertebrate Biology), BIOL 340 (Human Physiology), BIOL 346 (Human Anatomy), as well as supervising undergraduate research projects and senior capstones (BIOL 388/388S/389/389S/390) For administrative duties as Executive Officer, see above, Section 1, Brief Biography.
- 2004–2006: Full-Time Lecturer, Department of Biology, CWRU. Courses taught: BIOL 223, BIOL 346, BIOL 340, BIOL/EECS 375/475 (Autonomous Robotics).
- 1996–2004: Adjunct Instructor, Department of Biology, CWRU. Courses taught: BIOL 119/121, various crosslists of “Autonomous Robotics” (see below, Section 6, Teaching Experience).
- 1996–2004: Senior Research Associate, laboratory of Dr. Hillel J. Chiel, Department of Biology, CWRU. Duties included multi-axis video recording of *Aplysia* feeding behavior, development of kinematic computer models from multi-axis video and real-time MRI data, histology of the *Aplysia* buccal mass, salt-water aquarium maintenance, Lab Safety Officer, lab computer sysadmin, lab equipment calibration and repair, and undergraduate/graduate student mentoring.
- 1993–1996: Research Associate, laboratory of Dr. Hillel J. Chiel, Department of Biology, CWRU.
- 1992–1993: Research Assistant, laboratory of Dr. Hillel J. Chiel, Department of Biology, CWRU.
- 1986–1987: Laboratory Technician I, laboratory of Dr. Arnold I. Caplan, Department of Biology, CWRU. Duties included electron microscopy (rotary shadowing of proteoglycans, microscope maintenance), histology (tissue fixation, paraffin embedding, microtomy, staining, photography), 35 mm darkroom work (BW film development, printing), medical illustration, and lab equipment maintenance/repair.
- 1981, 1982: (summers) Orderly, St. Elizabeth’s Hospital, Youngstown, Ohio. Duties included patient transport, assistance with patient feeding and personal hygiene, urinary catheterization of male patients, taking vital signs several times per shift, recording daily weights and fluid intake/output information, entering data into charts, making beds, minor housekeeping and restocking, and treatment room prep for psychiatric patients receiving electroshock therapy

4. Professional Organizations.

- 2004–date: American Society for Engineering Education (ASEE).
1994–date: Society for Neuroscience.
1993–date: Sigma Xi Scientific Research Society, CWRU Chapter.
1984–date: Phi Beta Kappa, Alpha of Ohio Chapter.

5. Awards and Honors.

- 2014: Nominee for Carl F. Wittke Award for Excellence in Undergraduate Teaching, CWRU.
- 2013: Nominee for Carl F. Wittke Award for Excellence in Undergraduate Teaching, CWRU.
Winner, Robert Niebaum Award for Outstanding Chapter Advisor, Greek Life, CWRU.
Winner, the Mighty Mitchell Award™, ADAMcon 25, Kingston, Ontario, Canada, 18–21 July 2013.
- 2010: Nominee for Carl F. Wittke Award for Excellence in Undergraduate Teaching, CWRU.
- 2008: Winner, 2008 Best Paper Award, Division of Experimentation and Laboratory Oriented Studies (DELOS) of the American Society for Engineering Education (ASEE), for:
Drushel, R.F., and J.C. Gallagher (2008). The virtual classroom environment of a WWW-based autonomous robotics laboratory: Factors affecting student participation, communication, and performance. Paper 1550, *Proc. ASEE National Conference* (Pittsburgh, PA); also presented 23 June 2008.
- 2007: Nominee for Student Leadership Award, Outstanding Faculty Advisor for a Student Organization (Beta Nu Chapter, Theta Chi Fraternity), CWRU.
- 2006: Invitee to Seniors' Salute Reception, by BIOL 346 (Fall 2004) and BIOL 340 (Spring 2006) student Beth Stepanczuk, in recognition of undergraduate mentoring, Severance Hall, Cleveland, OH, 24 March 2006.
Mortar Board "Top Prof", Lux Chapter, CWRU, 24 February 2006.
- 2005: Nominee for Carl F. Wittke Award for Excellence in Undergraduate Teaching, CWRU.
Nominee for J. Bruce Jackson, M.D., Award for Excellence in Undergraduate Mentoring, CWRU.
Student Leadership Award, Outstanding Faculty Advisor for a Student Organization (CWRU Film Society; Beta Nu Chapter, Theta Chi Fraternity), CWRU.
Outstanding Faculty Member, Interfraternity Congress and Panhellenic Council, CWRU.
Nominee for Undergraduate Teaching Excellence Award, Undergraduate Student Government, CWRU.
Invitee to Seniors' Salute Reception, by BIOL 346 (Fall 2004) student Tara Menon, in recognition of undergraduate mentoring, Severance Hall, Cleveland, OH, 1 April 2005.

- 2003: Awarded University Center for Innovation in Teaching and Education (UCITE) Fellowship, CWRU, Fall 2003.
- Honored for 10 years of service at CWRU Staff Service Awards Luncheon, 12 June.
- Nominee for Student Leadership Award, Outstanding Faculty Advisor for a Student Organization (Beta Nu Chapter, Theta Chi Fraternity), CWRU.
- 2002: Nominee for Carl F. Wittke Award for Excellence in Undergraduate Teaching, CWRU.
- Student Leadership Award, Outstanding Faculty Advisor for a Student Organization (Beta Nu Chapter, Theta Chi Fraternity), CWRU.
- 2001: Alumni Award, Spring 2001 semester, Beta Nu Chapter, Theta Chi Fraternity, CWRU.
- 2000: Alumni Award, Fall 2000 semester, Beta Nu Chapter, Theta Chi Fraternity, CWRU.
- Golden Key Society, honorary member, Fall 2000, CWRU.
- Alumni Service Award, Spring 2000 semester, Beta Nu Chapter, Theta Chi Fraternity, CWRU.
- Faculty Member of the Semester, Spring 2000, Greek Life Office, CWRU.
- Faculty Member of the Month, December/January, Greek Life Office, CWRU.
- 1999: Hewlett Awards Committee, CWRU, award of a new desktop computer for use in undergraduate education.
- 1984: Phi Beta Kappa, Alpha of Ohio Chapter.
- Richard Reichert Award: To the CWRU fraternity/sorority member who has made the greatest contribution to campus life, CWRU.
- 1983: William Grauer Award for Excellence in Drawing, Art Studios, CWRU.
- 1980–1984: Alumni Scholarship (half-tuition), CWRU.

6. Teaching Experience.

- Fall 2014: BIOL 346, Human Anatomy. Since Fall 2012, I have used a self-created 1 hour/week “virtual” regional dissection lab component, in addition to 2 hours/week lectures. This contains multimedia imagery from atlases, textbooks, and autopsy studies, in lieu of the cadaver prosection/demonstration model last used in Fall 2006. The accompanying self-written lab manual was expanded from 10 laboratories to 12, by splitting 2 large labs into 4 smaller labs. This was made possible by placing the exams and lab practicals outside of the course meeting pattern (during a common exam block created by the Provost), to reclaim 5 class meeting periods. Duties include preparation/delivery of lectures, 4 exams per semester, and 4 “virtual” lab practicals per semester.
- Spring 2014: BIOL 223, Vertebrate Biology. This is an introductory undergraduate laboratory course in comparative vertebrate anatomy, histology, and vertebrate evolution. Students dissect representative vertebrates (shark and cat) and make detailed anatomical observations and drawings in a written notebook (which counts for about 1/2 of the course grade). There is 1 hour of recitation and at least 10 hours of laboratory per week (the lab is open 24/7), with 2 lab practicals. Students are also graded on lab practical station set-up, dissection skill, and a 2-week free exploration project in anatomy or histology. Two lab sections met 3 hours Tuesdays or

Thursdays, with a 1-hour recitation for both lab sections on Mondays. Lab exercises include formal drawing and dissection tutorials. Due to large enrollment, one graduate teaching assistant (Tara Kelloway) was used during both lab sections, and to grade half of the lab practicals; I did all the other grading.

BIOL 340, Human Physiology. Duties include preparation/delivery of lectures and 4 exams per semester. Clinical case studies are emphasized. Due to large enrollment, one graduate grading assistant (Jennifer Piechowski) was utilized for half of the grading of exams.

Fall 2013: BIOL 346, Human Anatomy. Due to large enrollment, one graduate grading assistant (Jennifer Piechowski) was utilized for half of the grading of both exams and lab practicals.

Spring 2013: BIOL 223, Vertebrate Biology. One lab section meeting 3 hours on both Tuesdays and Thursdays, with a 1-hour recitation on Mondays. One graduate teaching assistant (Nicholas Drew) was used during the labs, but not for grading.

BIOL 340, Human Physiology. Due to large enrollment, one graduate grading assistant (Catherine Kehl) was utilized for half of the grading of exams.

Fall 2012: BIOL 346, Human Anatomy. I returned to this advanced undergraduate course after a 6-year hiatus, covering for Dr. Ron Oldfield during a 1-year leave of absence. Since Fall 2007, it had been taught as 3 hours of lecture per week, the 1-hour cadaver demonstration lab having been dropped as enrollments exceeded 100 students. I re-introduced a lab component as a 1-hour/week “virtual” regional dissection lab, utilizing imagery from atlases, textbooks, and autopsy studies. The other 2 hours/week were ordinary lectures. By the end of the semester, the new written materials for the “virtual” lab component constituted a textbook suitable for either cadaver-based or “virtual” anatomy demonstrations, which I will use in future offerings of the course. Duties include preparation/delivery of lectures, 4 exams per semester, and 4 “virtual” lab practicals per semester. One graduate grading assistant (Catherine Kehl) was utilized for half of the grading of both exams and lab practicals.

Spring 2012: BIOL 119, Concepts Toward a Molecular View of Biology I. The first semester of a 2-semester core course for freshman B.S.N. students at the Frances Payne Bolton School of Nursing. Introduction to the principles of inorganic and organic chemistry essential to the study of biochemistry, molecular biology, and pharmacology. Topics include: atomic theory, the periodic table, chemical bonds, molecular geometry, ideal gas laws, equilibrium and reaction rates, acids and bases, nuclear chemistry, and nomenclature and reactions of organic compounds (including alkyl, aryl, alcohol carbonyl, and amino compounds). Problems involving numeric computation are emphasized. 4 written exams. Weekly graded homework was added based upon student feedback from previous semesters.

Fall 2011: BIOL 121, Concepts Toward a Molecular View of Biology II. The second semester of a 2-semester core course for freshman B.S.N. students at the Frances Payne Bolton School of Nursing. Topics include: carbohydrates, lipids, proteins, enzyme kinetics, metabolic pathways and bioenergetics, DNA and RNA, methods of molecular biology, and nutrition. Applications to human physiology and medicine are emphasized. 4 written exams.

BIOL 223, Vertebrate Biology (Thursday section), with Dr. Ron Oldfield (Tuesday section). This was the last Fall semester offering of the course; it switched to Springs in 2013. One graduate teaching assistant (G. Robert Browning) was used for both sections, but not for any grading.

Spring 2011: BIOL 119, Concepts Toward a Molecular View of Biology I.

Fall 2010: BIOL 121, Concepts Toward a Molecular View of Biology II.

BIOL 223, Vertebrate Biology (Thursday section), with Dr. Ron Oldfield (Tuesday section). One

graduate teaching assistant (Nicoletta Frankenstein) was used for both sections, but not for any grading.

Spring 2010: BIOL 119, Concepts Toward a Molecular View of Biology I.

Fall 2009: BIOL 121, Concepts Toward a Molecular View of Biology II.

BIOL 223, Vertebrate Biology (Thursday section), with Dr. Ron Oldfield (Tuesday section). A formal drawing and hand-lettering exercise was added, to help students keep better laboratory notebook documentation. One graduate teaching assistant (Nicoletta Frankenstein) was used for both sections, but not for any grading.

Spring 2009: BIOL 119, Concepts Toward a Molecular View of Biology I.

Fall 2008: BIOL 121, Concepts Toward a Molecular View of Biology II.

BIOL 223, Vertebrate Biology, with Dr. Ron Oldfield. For the first time, there were two lab sections of the course: Tuesday (me) and Thursday (Dr. Oldfield), both with a Monday recitation. Since Dr. Oldfield was new to the course, I attended both sections, and both sections took the lab practicals together. A dissection methods tutorial was added, using preserved chicken hindquarters as practice specimens.

Spring 2008: BIOL 119, Concepts Toward a Molecular View of Biology I.

CEG 499, WWW Autonomous Robotics (Wright State University), with Dr. John Gallagher, Department of Computer Engineering and Science, Wright State University, Dayton, OH. This course is an engineering practicum offered entirely via the Internet. We provide a mobile robot simulator and access to a mobile robot in our lab via the WWW. Students develop a series of robot controllers of increasing complexity. The main point of the class is to allow students a chance to engage in significant design and testing in a friendly practicum environment. The course is low threshold, high ceiling. This means that one can participate fully with minimal formal training, yet still have the ability to attack research level problems with sufficient motivation and ability. Spring Quarter.

Fall 2007: BIOL 223, Vertebrate Biology. Students dissected the shark and cat (lampreys were dropped).

Spring 2007: BIOL 340, Human Physiology. This is an advanced undergraduate course with 3 hours of lecture per week. Duties include preparation/delivery of lectures, plus 4 exams per semester.

Fall 2006: BIOL 223, Vertebrate Biology. The weekly lecture was changed to part background, part recitation, and the lecture exams were discontinued. Course grade was midterm and final lab practical and lab notebook. Students dissected the lamprey, shark, and cat or rabbit (not enough cats were available). An optional 2-week free exploration exercise was introduced.

BIOL 346, Human Anatomy. This is an advanced undergraduate course with 2 hours of lecture and 1 hour of demonstration laboratory (utilizing prosected male and female cadavers) per week. Duties include preparation/delivery of lectures, 4 exams per semester, 4 lab practicals per semester, supervision of prosection staff (8 2nd-year medical students) and occasional prosections on my own. I also maintained a dedicated Anatomy/Physiology Resource Room (Millis 506A, currently Millis 320A) to contain the Department's human osteological and anatomical collection, augmented by personal materials (reference books, teaching skeleton; compound microscope); the room was available to students 24/7 and could accommodate 6 or more students at once. Due to personal illness and unexpected surgery, the final 2 lab practicals were cancelled.

Summer 2006: BIOL 803, Inquiry-Based Approaches To Autonomous Robotics. An 8-day course which introduces principles of autonomous robotics to elementary, middle, and high school teachers,

taught in a prototype distance-learning format. The course includes template-based programming in Java, the use of a robot simulator, and teleoperated robots in the laboratory of Dr. John C. Gallagher, Associate Professor, Department of Computer Science, Wright State University, Dayton, OH. 6 teachers and 3 students participated. 21–30 June 2006.

Spring 2006: BIOL 216, Organisms and Ecosystems. Co-laboratory coordinator (with Dr. Joanne Westin). Duties include setup, troubleshooting, and maintenance of lab equipment (electrophysiology, spirometry, computers, aquaria), assisting students during 3 3-hour lab sections per week, and being on call for the remaining 3 3-hour lab sections per week. No grading and no formal teaching responsibilities; did not participate in the lecture component of the course.

BIOL 340, Human Physiology.

CEG 499, WWW Autonomous Robotics (Wright State University), with Dr. John Gallagher, Department of Computer Engineering and Science, Wright State University, Dayton, OH. Spring Quarter.

Fall 2005: BIOL 223, Vertebrate Biology. The course had 1 lecture and 10 hours of lab per week, with 2 lecture exams and 2 lab practicals. Midterm and final lab notebooks were the remainder of the course grade. Students dissected the lamprey, shark, salamander, and cat.

BIOL 346, Human Anatomy.

Summer 2005: BIOL 803, Inquiry-Based Approaches To Autonomous Robotics. A 10-day course which introduces principles of autonomous robotics to elementary, middle, and high school teachers. Major changes from the Summer 2004 offering were the introduction of a prototype distance-learning format and migration from a LEGO-based student-designed robot programmed in C to a fixed-design Khepera robot programmed in Java. The course included template-based programming in Java, the use of a robot simulator, and teleoperated robots in the laboratory of Dr. John C. Gallagher, Assistant Professor, Department of Computer Science, Wright State University, Dayton, OH. 4 teachers and 1 student participated. 13–24 June 2005.

Spring 2005: BIOL 216, Organisms and Ecosystems. Co-laboratory coordinator (with Dr. Joanne Westin).

BIOL 340, Human Physiology.

CEG 499, WWW Autonomous Robotics (Wright State University), with Dr. John Gallagher, Department of Computer Engineering and Science, Wright State University, Dayton, OH. Spring Quarter.

Fall 2004: BIOL 346, Human Anatomy. I created the Anatomy/Physiology Resource Room (Millis 506A) this semester.

BIOL/EECS 375/475, Autonomous Robotics, with Dr. Randy Beer. This undergraduate/graduate course involves the construction of autonomous robots using a 68HC11 microprocessor board programmed in C, various touch and photosensors, and peripheral structures constructed from LEGO bricks, motors, and gears. Duties include preparing student exercises in C programming, LEGO construction, and sensor calibration; sensor construction; designing, building, and writing system software for new sensors; debugging microprocessor hardware; assisting students with design, programming, and hardware debugging. The end-of-semester Egg Hunt competition was held at the Great Lakes Science Center on 11 December 2004.

Summer 2004: BIOL 803, Inquiry-Based Approaches To Autonomous Robotics. A 10-day course which introduces principles of autonomous robotics to elementary, middle, and high school teachers. The course content was augmented from the Summer 2003 version to include a 2-day module of template-based programming in Java, the use of a robot simulator, and teleoperated robots in the

laboratory of Dr. John C. Gallagher, Assistant Professor, Department of Computer Science, Wright State University, Dayton, OH. Seven teachers and 3 students participated. 14–25 June 2004.

- Spring 2004: BIOL/EECS 375/475, Autonomous Robotics (primary instructor), with Dr. Hillel Chiel. The end-of-semester Egg Hunt competition was held at the Great Lakes Science Center on 2 May 2004.
- Fall 2003: BIOL/EECS 375/475, Autonomous Robotics, with Dr. Randy Beer. The end-of-semester Egg Hunt competition was held at the Great Lakes Science Center on 13 December 2003.
- Summer 2003: BIOL 803, Inquiry-Based Approaches To Autonomous Robotics (formerly Autonomous Robotics for High School Science Teachers). There were 10 participants (8 teacher-teacher pairs from 4 schools, and 2 teacher-student pairs from 2 schools). Changes from the Summer 2001 offering included recruiting teacher-teacher and teacher-student pairs from the same school, not restricting enrollment to science teachers, and allowing elementary and middle school teachers to participate. The Howard Hughes Medical Institute sent a reporter to cover the course and write a story for an HHMI journal. 16–27 June 2003.
- Spring 2003: BIOL/EECS 375/475, Autonomous Robotics (primary instructor), with Dr. Hillel Chiel. The end-of-semester Egg Hunt competition was held at the Great Lakes Science Center on 4 May 2003, and also webcast live around the world through `apk.net`.
- Fall 2002: BIOL/EECS 375/475, Autonomous Robotics, with Dr. Randy Beer. The end-of-semester Egg Hunt competition was held at the Great Lakes Science Center on 14 December 2002, and also webcast live around the world through `apk.net`.
- Spring 2002: BIOL/EECS 375/475, Autonomous Robotics (primary instructor), with Dr. Hillel Chiel. The end-of-semester Egg Hunt competition was held at the Great Lakes Science Center on 28 April 2002, and also webcast live around the world through `apk.net`.
- Fall 2001: BIOL/ECES 375/475, Autonomous Robotics, with Dr. Randy Beer. The end-of-semester Egg Hunt competition was held at the Great Lakes Science Center on 9 December 2001, and also webcast live around the world through `apk.net`.
- Summer 2001: BIOL 803, Autonomous Robotics for High School Science Teachers. There were 6 participants. 18–29 June 2001.
- Spring 2001: BIOL/ECES 375/475, Autonomous Robotics (primary instructor), with Dr. Hillel Chiel. The end-of-semester Egg Hunt competition was held at the Great Lakes Science Center on 24 April 2001, and also webcast live around the world through `apk.net`.
- Fall 2000: BIOL/ECES 375/475, Autonomous Robotics, with Dr. Randy Beer. The end-of-semester Egg Hunt competition was held at the Great Lakes Science Center on 10 December 2000.
- Summer 2000: BIOL 803, Autonomous Robotics for High School Science Teachers. There were 10 participants, including one high school student working with a teacher from her school. 19–30 June 2000.
- Spring 2000: BIOL/ECES 375/475, Autonomous Robotics (primary instructor), with Dr. Hillel Chiel. The end-of-semester Egg Hunt competition was held at the Great Lakes Science Center on 30 April 2000, and also webcast live around the world through `discovery.com`.
- Summer 1999: BIOL 803, Autonomous Robotics for High School Science Teachers. There were 7 participants. 14–25 June 1999.
- Fall 1999: BIOL/ECES 375/475, Autonomous Robotics, with Dr. Randy Beer.

- Spring 1999: BIOL 121, Concepts for a Molecular View of Biology II.
BIOL/ECES 375/475, Autonomous Robotics (primary instructor), with Dr. Hillel Chiel.
- Fall 1998: BIOL 119, Concepts for a Molecular View of Biology I.
BIOL/ECES 375/475, Autonomous Robotics, with Dr. Randy Beer.
- Spring 1998: BIOL 121, Concepts for a Molecular View of Biology II.
BIOL/ECMP 375/475, Autonomous Robotics (primary instructor), with Dr. Hillel Chiel.
- Fall 1997: BIOL 119, Concepts for a Molecular View of Biology I.
BIOL/ECMP 375/475, Autonomous Robotics, with Dr. Randy Beer.
- Spring 1997: BIOL/ECMP 375/475, Autonomous Robotics (primary instructor), with Dr. Randy Beer and Dr. Hillel Chiel.
- Fall 1996: BIOL/CMPS/NEUR 479, Seminar in Computational Neuroscience (the precursor to Autonomous Robotics; the same course with a different name), with Dr. Randy Beer.
- Spring 1996: BIOL/CMPS/EBME/NEUR 479, Seminar in Computational Neuroscience (primary instructor), with Dr. Hillel Chiel.
- Spring 1995: BIOL/CMPS/EBME/NEUR 479, Seminar in Computational Neuroscience (teaching assistant), supervised by Dr. Randy Beer and Dr. Hillel Chiel. This was the first time the LEGO robotics course was offered, and I was deeply involved in the construction of the course.
- Fall 1986: BIOL 111, Introductory Biology Laboratory (teaching assistant), supervised by Dr. Norman Alldridge (deceased), Department of Biology. Duties included brief weekly lectures, preparing weekly quizzes for my lab section, setting up lab practicals, and grading examinations.
- Spring 1986: BIOL 113, Comparative Vertebrate Anatomy (teaching assistant), supervised by Dr. Darhl Foreman (deceased), Department of Biology. Duties included prosections of rabbits and sharks, demonstration of vertebrate osteological specimens, teaching dissection techniques, preparing lab practicals, and grading examinations.
- Fall 1985: BIOL 346, Human Gross Anatomy (teaching assistant), supervised by Dr. Martin Rosenberg, Department of Biology. This is a core course for N.D. students at the Frances Payne Bolton School of Nursing. Duties included prosection of cadavers, demonstration of prosections, preparing lab practicals, and grading examinations.
- Spring 1985: BIOL 113, Comparative Vertebrate Anatomy (teaching assistant), supervised by Dr. Darhl Foreman (deceased), Department of Biology.
- Fall 1984: BIOL 346, Human Gross Anatomy (teaching assistant), supervised by Dr. Jocelyn Zika (deceased), Department of Anatomy, School of Medicine, CWRU.

7. Research Experience.

- Jul 2004–Jun 2009: Principal Investigator, DUE-0341150, NSF, Division of Undergraduate Education, CCLI-Educational Materials Division.
- Jun 1996–Aug 2004: Senior Research Associate, laboratory of Dr. Hillel J. Chiel, Department of Biology, CWRU.

Continuing to develop dynamic 3-D kinematic models of the radula-odontophore of the marine slug *Aplysia californica*, including validation techniques using data from multi-axis video and MRI imaging.

Jun 1993–Jun 1996: Research Associate, laboratory of Dr. Hillel J. Chiel, Department of Biology, CWRU. Developed a 3-dimensional model of the buccal mass of *Aplysia californica*, using computer-assisted graphical reconstruction techniques, as well as performing detailed kinematic studies of *Aplysia* feeding behavior from multi-axis video. Also supervised kinematic data acquisition by undergraduate students.

Dec 1992–Jun 1993: Research Assistant, laboratory of Dr. Hillel Chiel, J. Department of Biology, CWRU. Began development of a 3-dimensional model of the *Aplysia* buccal mass from serial cross sections.

1986–1987: Laboratory Technician I, laboratory of Dr. Arnold I. Caplan, Department of Biology, CWRU. Duties included routine light microscopic procedures (fixation, paraffin embedding, microtomy, staining, photomicrography), rotary shadowing of molecular sprays for electron microscopy, standard photographic darkroom work (developing, printing, figure preparation).

8. Grants Awarded.

18 Dec 2003: “A WWW Based Autonomous Robotics Practicum for Engineering Undergraduates and STEM Educators.” Award/Proposal DUE-0341150, NSF, Division of Undergraduate Education, CCLI-Educational Materials Division. Linked with Award/Proposal DUE-0341263, submitted by John C. Gallagher, Associate Professor, Department of Computer Science, Wright State University, Dayton, OH. This grant creates two web-based distance learning courses in autonomous robotics, one for undergraduates, the other for high-school teachers and science education majors. Both courses involve Java programming, robot simulators, and live teleoperated robotics monitored via streaming web video. Duration: 3 years (1 July 2004 to 30 June 2007, though no-cost extensions were granted through 30 June 2009). Direct costs: \$44,584.00 Indirect costs: \$23,630.00.

9. Research Publications.

Drushel, R.F., and J.C. Gallagher (2008). The virtual classroom environment of a WWW-based autonomous robotics laboratory: Factors affecting student participation, communication, and performance. Paper 1550, *Proc. ASEE National Conference* (Pittsburgh, PA); also presented as lecture on 23 June 2008.

Neustadter, D.M., Herman, R.L., Drushel, R.F., Chestek, D.W., and H.J. Chiel (2007). The kinematics of multifunctionality: Comparisons of biting and swallowing in *Aplysia californica* based on *in vivo* magnetic resonance imaging and kinematic modeling. *J. Exp. Biol.* **210**: 236–260.

Drushel, R.F., and J.C. Gallagher (2006). Comparing a distance-learning and a traditional offering of an autonomous robotics practicum: Lessons and observations. Paper 2063, *Proc. ASEE National Conference* (Chicago, IL); also presented in poster form 19 June 2006.

Chestek, D., Drushel, R.F., and H.J. Chiel (2005). Kinematic modeling of I1/I3 in *Aplysia californica*. Abstract 375, Research ShowCASE 2005, CWRU. Cleveland, OH, 7 April 2005.

Gallagher, J.C., Bolick, D.S., and R.F. Drushel (2005). Infrastructure supporting an internet-connected mobile robot supporting a WWW-based robotics practicum. *Proc. ASEE North-Central Conference* (Ohio Northern University, Ada, OH).

Gallagher, J.C., Drushel, R.F., and D. Bolick (2005). Increasing accessibility to a first-year engineering course in mobile autonomous robotics. Paper 2192, *Proc. ASEE National Conference* (Portland, OR).

- Gallagher, J.C., and R.F. Drushel (2005). Supporting engineering practica for undergraduates and STEM educators: An online robotics laboratory. Abstract, NSF Engineering and Computing Education Grantees Meeting, Washington, DC, 17–18 February 2005.
- Sutton, G.P., Drushel, R.F., Neustadter, D.M., Ye, H., Chestek, C., Snyder, V., Mangan, E.V., and H.J. Chiel (2003). Neural and biomechanical mechanisms of adaptive behavior. Abstract 182, Research ShowCASE 2003, CWRU, Cleveland, OH, 4 April 2003.
- Gallagher, J.C., Perretta, S., and R.F. Drushel (2002). Teaching autonomous robotics over the World Wide Web: An online computer engineering practicum. *Interactive Multimedia Electronic Journal of Computer-Enhanced Learning* **4** (2). <http://imej.wfu.edu/articles/2002/2/03/index.asp>
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- Sutton, G.P., Drushel, R.F., Neustadter, D.M., Crago, P.E., and H.J. Chiel (2000). A kinematic model of *Aplysia* swallowing based on MRI imaging. Abstract, 30th Annual Meeting, Society for Neuroscience.
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Fernandez, M.S., Dennis, J.E., Drushel, R.F., Carrino, D.A., Kimata, K., Yamagata, M., and A.I. Caplan (1991). The dynamics of compartmentalization of embryonic muscle by extracellular matrix molecules. *Dev. Biol.* **147**: 46–61.

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Drushel, R.F., and A.I. Caplan (1988). The extravascular fluid dynamics of the embryonic chick wing bud. *Dev. Biol.* **126**: 7–18.

Drushel, R.F., Pechak, D.G., and A.I. Caplan (1985). The anatomy, ultrastructure and fluid dynamics of the developing vasculature of the embryonic chick wing bud. *Cell Differ.* **16**: 13–28.

10. Books.

Drushel, R.F. (2014). *Laboratory Manual for BIOL 346*. Unpublished textbook used in the BIOL 346 Human Anatomy course since Fall 2012. In development for sale by Fall 2015.

Bolick, D.S., Gallagher, J.C., and R.F. Drushel (2005). *Learning autonomous robotics*. Unpublished textbook used in the CEG 499 Autonomous Robotics course.

11. Medical/Scientific Illustrations Appearing in Non-Authored Publications.

Chestek, C., Garverick, S.L., Halpern, J.M., Lu, H., Martin, H.B., Samsukha, P., Tabib-Azar, M., and J.A. Zarycki (2004). Novel technologies for recording and stimulating nerve cells. Abstract 271, Research ShowCASE 2004, CWRU, Cleveland, OH, 2 April 2004. *Aplysia* buccal mass anatomy drawing.

Sutton, G.P., Macknin, J.B., Gartman, S.S., Sunny, G.P., Beer, R.D., Crago, P.E., Neustadter, D.M., and H.J. Chiel (2004). Passive hinge forces in the feeding apparatus of *Aplysia* aid retraction during biting but not during swallowing. *J. Comp. Physiol. A.* **190**: 501–514. Fig. 1.

Sutton, G.P., Mangan, E.V., Neustadter, D.M., Beer, R.D., Crago, P.E., and H.J. Chiel (2004). Neural control exploits changing mechanical advantage and context-dependence to generate different feeding responses in *Aplysia*. *Biol. Cybernetics* **91**: 333–345. Fig. 1.

Hurwitz, I., Neustadter, D.M., Morton, D.W., Chiel, H.J., and A.J. Susswein (1996). Activity patterns of the B31/B32 pattern initiators innervating the I2 muscle of the buccal mass during normal feeding movements in *Aplysia californica*. *J. Neurophysiol.* **75**: 1309–1326. Figs. 1 and 3.

Warman, E.N., and H.J. Chiel (1995). A new technique for chronic single extracellular recording in freely behaving animals using pipette electrodes. *J. Neurosci. Methods* **57**: 161–169. Fig. 2.

Pechak, D.G., Kujawa, M.J., and A.I. Caplan (1986). Morphological and histochemical events during first bone formation in embryonic chick limbs. *Bone* **7**: 441–458. Fig. 14.

Caplan, A.I. (1985). The vasculature and limb development. *Cell Differ.* **16**: 1–11. Figs. 1, 2, and 3.

12. Other Professional Press.

- Mrosko, T. (no byline) (2013). Fun and learning with LEGO. *Case Alumnus* **24**(3):21 (Spring 2013). Article and interview about my Autonomous Robotics courses and the LEGO robotics events for Homecoming 2012 and 2013, sponsored by the Case Alumni Association.
- Drushel, R. (2006). The journey north. *Boulevard Banter*, Spring 2006, p. 3. An invited article describing how 3rd-graders at Boulevard Elementary School, Cleveland Heights, OH, tracked the spring migration of monarch butterflies.
- Townsend, A. (2006). Plan to shut school draws residents to board meetings. *The Plain Dealer*, Cleveland, OH, 13 May 2006. Article about Cleveland Heights-University Heights elementary school reorganization. I was interviewed by phone and quoted in the article.
- Alexander, S. (no byline) (2003). Tag, you're IT. Howard Hughes Medical Institute website. Original link <http://www.hhmi.org/news/legorobotsgia.html>. An article about BIOL 803 Summer 2003.
- Brown, E. (2003). Rich man. *Case Magazine* **16**:42 (Fall 2003). Interview about my campus activities with Theta Chi Fraternity, the CWRU Film Society, and the Autonomous Robotics course.
- Varga, C. (ed.) (2003). *Annual Report 2002–2003, College of Arts And Sciences, Case Western Reserve University*. 55 pp. Brief writeup about my involvement with the robotic Egg Hunt competitions at the Great Lakes Science Center (p. 6) and full-page photo (p. 7), also used in cover photo montage.

13. Research Students.

- Fall 2014: Ali Hakim. "Differences and similarities in gross organization of musculo-skeletal systems in terrestrial vertebrates with relation to movement and body function." BIOL 388S (Undergraduate Research in Biology — SAGES Capstone), 3.0 credits, Biology Department and Research sponsor.
- Nabeel Mallick. BIOL 389 (Selected Topics in Biology), 2.0 credits, Biology Department and Research sponsor. Incomplete in Fall 2014, to be made up in Spring 2015.
- Madeline Newcomb. Member of Bachelor of Fine Arts (BFA) thesis committee, Cleveland Institute of Art, Cleveland, OH.
- Spring 2014: Christine Oak. "Differential effect of diosmetin on androgen-sensitive and androgen-refractory human prostate cancer cells growth." BIOL 388S (Undergraduate Research in Biology — SAGES Capstone), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Sanjeev Shukla, Department of Urology, School of Medicine, CWRU, Cleveland, OH.
- Fall 2013: Maxwell Yeager. "Study and illustration of carnivoran skull morphology." BIOL 389S (Selected Topics in Biology — SAGES Capstone), 3.0 credits.
- Spring 2013: Noémie Sierra-Walter: "Investigating cellular respecification and reverse ontogeny in *Turritopsis nutricula*." BIOL 389 (Selected Topics in Biology), 3.0 credits. Incomplete in Spring 2013, made up in Fall 2013.
- Fall 2012: Justine Ko: "Interleukin 6: A target against diet-induced tumor progression?" BIOL 390 (Advanced Undergraduate Research, 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Stephanie K. Doerner, Department of Genetics, School of Medicine, CWRU, Cleveland, OH.
- Erica Tangney: "Effects of modulation of energy expenditure on body weight in mice with cystic fibrosis." BIOL 388S (Undergraduate Research in Biology — SAGES Capstone), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Mitchell Drumm, Departments of Pediatrics and Genetics, School of Medicine, CWRU, Cleveland, OH.

- Summer 2012: William Leeds. "A summary of bioluminescence: Origins, diversity, biochemistry, functions and applications." BIOL 389 (Selected Topics in Biology), 1.0 credit.
- Spring 2012: Cynthia Bogusky. "Responses to drought stress in *Arabidopsis*: Understanding abscisic acid-dependent and abscisic acid-independent pathways of gene regulation." BIOL 389S (Selected Topics in Biology — SAGES Capstone), 3.0 credits.
- Ji Young Hwang. "The effect of dental condition of the wellness of the human body system, especially stress system." BIOL 389S (Selected Topics in Biology — SAGES Capstone), 3.0 credits.
- Justine Ko. "Interleukin 6: A target against diet-induced tumor progression?" BIOL 388S (Undergraduate Research in Biology — SAGES Capstone), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Stephanie K. Doerner, Department of Genetics, School of Medicine, CWRU, Cleveland, OH.
- Phillip Lewis. "Induced pluripotent stem cells." BIOL 389 (Selected Topics in Biology), 1.0 credit.
- Hilary Mohs. "Long-term alcohol abuse and altitude." BIOL 388S (Undergraduate Research in Biology — SAGES Capstone), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Barry Brenner, Department of Emergency Medicine, School of Medicine, CWRU, Cleveland, OH.
- Alexander Song. "Determining the effects of alcohol consumption and cigarette smoking on the risk of developing dementia and Alzheimer's disease." BIOL 389S (Selected Topics in Biology — SAGES Capstone), 3.0 credits.
- Elliot Schwartz. *c-Fos* expression in the superior cervical ganglia of diabetic mice." BIOL 388 (Undergraduate Research in Biology), 2.0 credits, Biology Department sponsor. Research sponsor: Dr. Richard Zigmond, Department of Neurosciences, School of Medicine, CWRU, Cleveland, OH.
- Meera Thakkar. "Polycystic ovarian syndrome (PCOS)." BIOL 389S (Selected Topics in Biology — SAGES Capstone), 3.0 credits.
- Fall 2011: Megan Collins. "Receptors for bacterial PAMPs contribute to the inflammatory response induced by orthopaedic wear particles: Preliminary results." Honors Thesis in Biology, thesis committee member. Research sponsor: Dr. Edward Greenfield, Department of Orthopaedics, School of Medicine, CWRU, Cleveland, OH. BIOC 391 (Research Project) sponsor: Dr. David Samols, Department of Biochemistry, School of Medicine, CWRU, Cleveland, OH.
- Puja Mehta. "Human bipedalism." BIOL 389S (Selected Topics in Biology — SAGES Capstone), 3.0 credits.
- Erica Tangney. "The effects of high-fat feeding on body composition and energy metabolism in Cystic Fibrosis mice." BIOL 388 (Undergraduate Research in Biology), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Mitchell Drumm, Departments of Pediatrics and Genetics, School of Medicine, CWRU, Cleveland, OH.
- Spring 2011: Megan Collins. "Receptors for bacterial PAMPs contribute to the inflammatory response induced by orthopaedic wear particles: Preliminary results." BIOL 388S (Undergraduate Research in Biology — SAGES Capstone), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Edward Greenfield, Department of Orthopaedics, School of Medicine, CWRU, Cleveland, OH.
- Meridith Ginesi. "The development of visual prostheses: A comparison of efforts and locations." BIOL 389S (Selected Topics in Biology — SAGES Capstone), 3.0 credits.

Laura Hallstrom. “A brief review of national HIV testing practices, linking HIV-positive persons to care, and care retention.” BIOL 389S (Selected Topics in Biology — SAGES Capstone), 3.0 credits.

Fall 2010: Shane Jeffers. “T-cell involvement in induced colitis.” BIOL 388S (Undergraduate Research in Biology — SAGES Capstone), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. M. Edward Medof, Department of Pathology, School of Medicine, CWRU, Cleveland, OH. Incomplete in Fall 2010, made up in Spring 2011.

Sherry Niggel. “Review of ‘biting’ and ‘swallowing’ in *Aplysia californica* during feeding behavior.” BIOL 389 (Selected Topics in Biology), 2.0 credits.

Summer 2010: Kitsie Penick. “Epitope retrieval for type X collagen detection.” BIOL 389 (Selected Topics in Biology), 1.0 credit.

Brian Weeks. “Early developmental synaptic strengthening: An investigation of activity-dependent homeostasis within the synapses of cortical neurons.” BIOL 388 (Undergraduate Research in Biology), 2.0 credits, Biology Department sponsor. Research sponsor: Dr. Shasta Sabo, Department of Pharmacology, School of Medicine, CWRU.

Spring 2010: Hanya Almodallal. “Diabetic neuropathy and foot care.” BIOL 389S (Selected Topics in Biology — SAGES Capstone), 3.0 credits.

Lauren Hennen. “Targeted disruption of CCR5 functioning to treat HIV-1 infection.” BIOL 389S (Selected Topics in Biology — SAGES Capstone), 3.0 credits.

Lee Sasala. “Differences in the femoral notch between gender and race.” BIOL 388S (Undergraduate Research in Biology — SAGES Capstone), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Scott Simpson, Department of Anatomy, School of Medicine, CWRU.

Susannah Selnick. “HIV-1 *Gag*: A role in cell fusion?” BIOL 388S (Undergraduate Research in Biology — SAGES Capstone), 3.0 credits, Biology Department sponsor. Research Sponsor: Dr. Eric Arts, Department of Infectious Disease, University Hospitals of Cleveland, Cleveland, OH.

Fall 2009: Mythili Raghunath. “Gender differences in the perception of periodontal disease.” BIOL 388 (Undergraduate Research in Biology), 2.0 credits, Biology Department sponsor. Research sponsor: Dr. Leena Palomo, School of Dental Medicine, CWRU. Incomplete in Fall 2009, made up in Spring 2010.

Sherry Yu. “Role of macrophages in glia limitans disruption during JHMV infection II.” BIOL 390 (Advanced Undergraduate Research in Biology), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Richard Ransohoff, Department of Neurosciences, Lerner Research Institute, Cleveland Clinic Foundation, Cleveland, OH.

Spring 2009: Nicoletta Frankenstein. “Reproductive system of the pregnant cat.” BIOL 388 (Undergraduate Research in Biology), 3.0 credits.

Qi (Kelly) Jia. “Development of a micro-integration technique for the fabrication of a cell-fiber complex in heart valve tissue engineering.” BIOL 388 (Undergraduate Research in Biology), 2.0 credits, Biology Department sponsor. Research sponsor: Dr. Jakov Elgudin, V.A. Hospital, Cleveland, OH.

Kathleen Overholser (Spring 2009). “The role of live animal exhibits and demonstrations in increasing general animal awareness.” BIOL 389 (Selected Topics in Biology), 1.0 credit.

- Sherry Yu. "Role of macrophages in glia limitans disruption during JHMV infection." BIOL 388S (Undergraduate Research in Biology — SAGES Capstone), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Richard Ransohoff, Department of Neurosciences, Lerner Research Institute, Cleveland Clinic Foundation, Cleveland, OH.
- Fall 2008: John Fentiman. "2,4-Dinitrophenol as a potential treatment for hypothermia." BIOL 389S (Selected Topics in Biology — SAGES Capstone), 3.0 credits. Incomplete in Fall 2008, made up in Spring 2009.
- Spring 2008: Rami El-Shaar. "Diabetes and obesity: A review." BIOL 389 (Selected Topics in Biology), 1.0 credit.
- Niailah Ochai. "Woody encroachment of savanna species: A literature review." BIOL 389S (Selected Topics in Biology — SAGES Capstone), 3.0 credits.
- Fall 2007: Amy Huddleston. "The future of HIV/AIDS treatments: Gene therapy." BIOL 389 (Selected Topics in Biology), 1.0 credit.
- Nicole Segura. "Factors affecting decomposition rates of cadavers in outdoor environments." BIOL 389S (Selected Topics in Biology — SAGES Capstone), 3.0 credits. Incomplete in Fall 2007, made up in Spring 2008.
- Summer 2007: Amir Yeganeh. "Independence of antibody response to rWSP from TLR2, and the identification of potential crucial regions for antibody binding within WSP." BIOL 388 (Undergraduate Research in Biology), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Eric Pearlman, Department of Ophthalmology, University Hospitals of Cleveland, Cleveland, OH. Incomplete in Summer 2007, made up in Fall 2007.
- Spring 2007: Rachael Welter. "The power of fusing Western and Chinese medicine in ophthalmology." BIOL 389 (Selected Topics in Biology), 1.0 credit.
- Spring 2006: Erin Brandt. "Angiopoietin-1 increases the rate of wound healing in diabetic and non-diabetic mice." BIOL 390 (Advanced Undergraduate Research in Biology), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Nicole Ward, Department of Dermatology, University Hospitals of Cleveland, Cleveland, OH.
- Elizabeth Townsley. "Development of mSPI." BIOL 390 (Advanced Undergraduate Research in Biology), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Alan Tartakoff, Department of Pathology, School of Medicine, CWRU.
- Fall 2005: Elizabeth Townsley. "cDNA library profiling in *Saccharomyces cerevisiae* using DNA microarrays." BIOL 388 (Undergraduate Research in Biology), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Alan Tartakoff, Department of Pathology, School of Medicine, CWRU.
- Spring 2005: Ryan Novince. "Interaction between malaria and EBV: Immunologic and molecular risk factors for endemic Burkitt's lymphoma in western Kenya." BIOL 388 (Undergraduate Research in Biology), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Ann Moormann, Center for Global Health and Diseases, School of Medicine, CWRU.
- Nicholas Spassil. "Diet effects on hypoxic ventilatory response." BIOL 388 (Undergraduate Research in Biology), 3.0 credits, Biology Department sponsor. Research sponsor: Dr. Michelle Puchowicz, Department of Anatomy, School of Medicine, CWRU.
- Daniel Sunwoo. "Behavior of a stomatin mouse in volatile anesthetics." BIOL 388 (Undergraduate Research in Biology), 3.0 credits, Biology Department sponsor. Research

sponsor: Dr. Philip Morgan, Department of Genetics, School of Medicine, CWRU.

- Summer 2004: David Chestek. 3-D reconstruction of the I1/I3 muscle group in the buccal mass of *Aplysia californica* from multi-axis video, Hillel J. Chiel laboratory, Department of Biology, CWRU.
- Spring 2004: David Chestek. 3-D reconstruction of the I1/I3 muscle group in the buccal mass of *Aplysia californica* from multi-axis video, Hillel J. Chiel laboratory, Department of Biology, CWRU.
- Spring 2003: Andrew Jones and Michael Krofcheck: Wireless communication project for LEGO robots, EECS 398 (Senior Project in Electrical Engineering), 3.0 credits.
- Fall 2002: Andrew Jones, Michael Krofcheck, Victor Lee, and Nicholas Lunn. "Integrating short-range communication onto LEGO robots." EECS 398 (Senior Project in Electrical Engineering), 3.0 credits, faculty advisor (with Dr. Frank Merit, Department of Electrical Engineering and Computer Science, CWRU).
- Spring 2000: Adam Feldman. Navigator robot project, ECES 396 (Special Topics Computer Science), 3.0 credits.
- Fall 1999: Adam Feldman. Navigator robot project, ECES 396 (Special Topics Computer Science), 3.0 credits.
- Joshua Kershner. Navigator robot project, BIOL 388 (Undergraduate Research in Biology), 3.0 credits.

14. Administrative Training and Activities.

- 2014–date: Member of Undergraduate Affairs Committee, a spin-off of the Biology Curriculum Committee.
- 2013: Served on 4-person search committee for two new instructors for additional teaching in the Biology core curriculum. Dr. Leena Chakravarty and Dr. Susan Burden-Gulley were hired as a result of this search. August 2013.
- Attended A.L.I.C.E. crisis training, Thwing Ballroom, CWRU. 26 April 2013.
- 2011: Served on 3-person search committee for a new lecturer position. Dr. Dianne Kube was hired as a result of this search. August 2011.
- Created and edited the initial Biology Department entry for the new online University Bulletin, using CourseLeaf. May–June 2011.
- CourseLeaf online bulletin editor training. 90 minutes, 6 April 2011.
- 2010: Wrote and submitted a proposal on behalf of the Biology Department for an Undergraduate Advising Initiative through the Office of the Provost, CWRU. 1 June 2010.
- Researched and devised a 5-semester plan to shift the Biology core curriculum from a spring-freshman start to a fall-freshman start. Summer 2010. Plan was adopted by Biology faculty vote in October 2010, and implementation began in Fall 2011; completed in Fall 2013.
- 2009–2012: Academic liaison between the Biology department and the Frances Payne Bolton School of Nursing (FPB). I worked closely with the First-Year Coordinator, Ms. Marcella Hovanscek.
- 2009–2010: Chair of Biology Curriculum Committee.

- 2009: Attended a sequence of seminars about Service Learning to explore course development options. Center for Civic Engagement and Learning, CWRU. Spring 2009.
- 2007: Served on 3-person search committee for a new instructor position for teaching in anatomy and physiology. Dr. Ronald Oldfield was hired as a result of this search. July–August 2007.
- PeopleSoft SOC (Schedule of Classes) training. 3 hours, 16 October 2007.
- PCARD electronic purchase card training. 90 minutes, 3 October 2007.
- SEED (Supervisory Education and Excellence Development) supervisors training program. Monthly 3-hour sessions, February–July 2007.
- 2006–date: Member of Biology Curriculum Committee.

15. Organized Recruiting and Outreach.

- General: Until October 2012, when the new Undergraduate Coordinator position was created, I was the designated contact person for all potential students with interest in Biology and premedical/pre-dental/pre-veterinary studies. I met with high school students during Fall and Spring semesters. I answered E-mail and phone inquiries. I am also an ongoing resource for the Undergraduate Coordinator.
- Fall 2014: Biology Gala. A meet-the-faculty event for freshmen interested in Biology. I staffed a table for anatomy and physiology courses. Hovorka Atrium, CWRU. 7 November 2014.
- Choices Fair. Distributed information about Biology and Systems Biology to freshmen (with Ms. Katie Bingman, Undergraduate Coordinator). Veale Center, CWRU. 10 October 2014.
- Summer 2014: Online Information Session: Biological Sciences (with Dr. Chris Cullis, Biology Chair). 1-hour live webcast with information about 1st-year programs for Biology, Systems Biology, Biochemistry, and Nutrition. I prepared the PowerPoint slideshow which was intercut with the live presenters feed; both of us fielded live questions from the viewing audience. 27 June 2014. Currently archived on YouTube at <http://www.youtube.com/watch?v=Ep149BA0Roc>
- Spring 2014: Admission Open House program. 5 dates. Led 1-hour teaching lab tours on 14 February and 03/04/17/21 April 2014.
- Fall 2013: Admission Open House program. Led a 1-hour teaching lab tour on 11 November 2013.
- Biology Gala. Hovorka Atrium, CWRU. 25 October 2013.
- Choices Fair (with Ms. Katie Bingman, Undergraduate Coordinator). Veale Center, CWRU. 11 October 2013.
- Summer 2013: Online Information Session: Biological Sciences (with Dr. Chris Cullis, Biology Chair). 1-hour live webcast with information about 1st-year programs for Biology, Systems Biology, Biochemistry, and Nutrition. 26 June 2013. The webcast is currently archived on YouTube at <http://www.youtube.com/watch?v=kVXM59AU1Nk>
- Spring 2013: Admission Open House program. 6 dates. I did 1 meet-and-greet on 29 March, led 5 teaching lab tours (18 February, 27 March, and 15/19/22 April 2013). I also gave 8 impromptu tours of the BIOL 223 (Vertebrate Biology) lab as small groups of visiting students wandered in from some other tour.

- Fall 2012: Admission Open House program. Led 1-hour teaching lab tours on 8 October and 9 November 2012.
- Biology Gala. Hovorka Atrium, CWRU. 2 November 2012.
- Choices Fair (with Ms. Katie Bingman, Undergraduate Coordinator). Veale Center, CWRU. 5 October 2012.
- Summer 2012: Online Information Session: Biological Sciences (with Dr. Chris Cullis, Biology Chair). 1-hour live webcast with information about 1st-year programs for Biology, Systems Biology, Biochemistry, and Nutrition. 25 June 2012. The webcast is currently archived on YouTube at <http://www.youtube.com/watch?v=dMW0bPzD1LU>
- Exploration Video: Biology. 3-minute informational video about Biology, done as an interview of me by an undergraduate student (Nick Pilla). This is one of a series of videos about various departments, prepared for Undergraduate Studies. Recorded 18 June 2012. The video is currently archived on YouTube at http://www.youtube.com/watch?v=Hfj2_6Z1OyA
- Spring 2012: Admission Open House program. Coordinator for Biology Department. Arranged for visiting students and Biology faculty to meet one-on-one in small groups in various faculty labs or teaching labs. 10 dates, February–April 2012. I did 1 meet-and-greet and led 1 lab tour on 20 February, and led lab tours on 22/23 March and 5/6/13/23 April.
- Fall 2011: Admission Open House program. Coordinator for Biology Department. Arranged faculty coverage for events on 10 October and 11 November 2011. Events included a 1-hour meeting with prospective students and 2 faculty/teaching lab tour blocks. I led 1 teaching lab tour on each date.
- Biology Gala. Helped to organize meet-the-faculty event for freshmen interested in Biology. Hovorka Atrium, CWRU. 28 October 2011.
- Choices Fair. Veale Center, CWRU. 7 October 2011.
- Spring 2011: Admitted Student Open House program. Coordinator for Biology Department. Arranged for visiting students and Biology faculty to meet one-on-one in small groups in various faculty labs or teaching labs. 9 dates, February–April 2011. I did 1 meet-and-greet on 21 February, led 2 lab tours on 18 March, and led 1 lab tour on 22 April.
- Fall 2010: Admission Open House program. Coordinator for Biology Department. Met with prospective students in 2 1-hour sessions on 11 October 2010. Arranged faculty coverage for similar event on 15 November 2010.
- Biology Gala. Hovorka Atrium, CWRU. 29 October 2010.
- Choices Fair. Veale Center, CWRU. 8 October 2010.
- Spring 2010: Admitted Student Open House program. Coordinator for Biology Department. Arranged for visiting students and Biology faculty to meet one-on-one in small groups in various faculty labs or teaching labs. 8 dates, February–April 2010.
- Saturday Open House. Distributed information to about Biology to admitted students and high-school juniors. Veale Center, CWRU. 10 April 2010.
- Fall 2009: Open House program. Gave 10-minute presentations for Biology to visiting high school students and their families. Rockefeller 301, CWRU. 31 October and 14 November 2009.

- Choices Fair. With Dr. Rebecca Benard. Veale Center, CWRU. 30 October 2009.
- Summer 2009: Summer Open House program. Coordinator for Biology Department. Met with student/family groups in Biology teaching labs. 6 dates, June–August 2009.
- Spring 2009: Admitted Student Open House program (formerly Experience Case). Coordinator for Biology Department. 10 dates, February–April 2009.
- Fall 2008: Open House program (formerly Get Connected with Case). Rockefeller 301, CWRU. 12 October and 15 November 2008.
- Choices Fair. Veale Center, CWRU. 31 October 2008.
- Spring 2008: Experience Case program. Coordinator for Biology Department. 10 dates, January–April 2008.
- Fall 2007: Get Connected with Case program. Strosacker Auditorium, CWRU. 28 October and 10 November 2007.
- Choices Fair. Veale Center, CWRU. 2 November 2007.
- Biology Gala. Hovorka Atrium, CWRU. 2 November 2007.
- Spring 2007: Experience Case program. 10 dates, January–April 2007.
- Fall 2006: Get Connected with Case program. Strosacker Auditorium, CWRU. 29 October and 18 November 2006.
- Choices Fair. Veale Center, CWRU. 3 November 2006.

16. Invited Seminars, Lectures, Presentations, and Campus Activities.

- 18 Nov 2014 “Thirty-Four Years of Biology Education at CWRU: A Personal Journey.” Department of Biology Seminar Series, CWRU.
- 11 Nov 2014 Attended a Scholarship Dinner presented by Beta Nu Chapter, Theta Chi Fraternity, and Phi sorority, CWRU.
- 20 Oct 2014 Attended a Scholarship Reception presented by Sigma Psi sorority and Beta Theta Pi fraternity, CWRU.
- 16 Sep 2014 Attended Greek Advisor dinner, Greek Life Office, CWRU.
- 4 Sep 2014 “Autonomous Robotics (BIOL/EECS/LEGO 375/475): Spring 1995–Fall 2005.” Slide presentation at Beta Nu Chapter, Theta Chi Fraternity, CWRU.
- 26 Aug 2014 Attended a public candlelight vigil at Zeta Beta Tau fraternity for 4 CWRU students killed in a plane crash.
- 19 Jul 2014 “History of Dr. D.’s LEGO Robot Course.” Slide presentation at ADAMcon XXVI (the 26th annual Coleco ADAM computer convention), Cleveland, OH, 17–20 July 2014.
- Gave a 4-hour autonomous robotics workshop at ADAMcon XXVI (the 26th annual Coleco ADAM computer convention), Cleveland, OH, 17–20 July 2014. This was a reprise of the event I ran at ADAMcon XIII in July 2001.

- 18 Jul 2014 “Building the 2014 Mighty Mitchell Award™.” Slide presentation at ADAMcon XXVI (the 26th annual Coleco ADAM computer convention), Cleveland, OH, 17–20 July 2014.
- “History of the Cleveland ADAMcons.” Slide presentation at ADAMcon XXVI (the 26th annual Coleco ADAM computer convention), Cleveland, OH, 17–20 July 2014.
- 14 Apr 2014 Attended Greek Life Awards dinner, Greek Life Office, CWRU.
- 25 Mar 2014 Attended Faculty Advisor luncheon, Greek Life Office, CWRU.
- 4 Feb 2014 Judge, Beachwood Science and Engineering Fair, Beachwood Middle/High Schools, Beachwood, OH.
- 28 Sep 2013 Organized a LEGO robotics competition and reunion of Autonomous Robotics (BIOL/EECS 375/475) course alumni for Homecoming, sponsored by the Case Alumni Association. Surviving robotics materials (mostly from BIOL 803) were resurrected from storage, along with 1990s-vintage computer hardware, to create 6 robot kits and 4 computer workstations. About 50 people were present overall, including 5 course alumni spanning Fall 1996–Fall 2004). Participants built MIT Handy Board-based LEGO robots from detailed plans and competed in an obstacle-avoidance contest in a walled arena set up in the Inamori Center, Crawford Hall, CWRU.
- 20 Jul 2013: “The 2013 Mighty Mitchell Award™: Software.” Slide presentation at ADAMcon 25 (the 25th annual Coleco ADAM computer convention), Kingston, Ontario, Canada, 18–21 July 2013.
- 19 Jul 2013: “The 2013 Mighty Mitchell Award™: Hardware.” Slide presentation at ADAMcon 25 (the 25th annual Coleco ADAM computer convention), Kingston, Ontario, Canada, 18–21 July 2013.
- 25 Apr 2013: Attended the Greek Life Awards ceremony, Thwing Ballroom, CWRU.
- 19 Apr 2013: Judge, Michelson-Morley Research Competition, Clapp 405, CWRU.
- 23 Feb 2013: Judge, Theta Chi “VØX” charity talent show, Thwing Ballroom, CWRU.
- 15 Nov 2012: Attended the Greek Life Faculty Advisor Luncheon, CWRU.
- 10 Oct 2012: Attended a Faculty Dinner given by Delta Tau Delta fraternity, CWRU.
- 29 Sep 2012: Organized a LEGO robotics competition and reunion of Autonomous Robotics (BIOL/EECS 375/475) course alumni for Homecoming, sponsored by the Case Alumni Association. Surviving robotics materials (mostly from BIOL 803) were resurrected from storage, along with 1990s-vintage computer hardware, to create 6 robot kits and 4 computer workstations. About 70 people were present overall, including 6 course alumni spanning Fall 1996–Fall 2005). Participants built MIT Handy Board-based LEGO robots from detailed plans and competed in an obstacle-avoidance contest in a walled arena set up on the 1st floor of Tomlinson Hall, CWRU.
- 1 May 2012: Faculty Dunk Tank, Thwing Study-Over before final exams, Thwing Center, CWRU.
- 25 Feb 2012: Judge, Theta Chi “VØX” charity talent show, Thwing Ballroom, CWRU.
- 25 Feb 2011: Judge, Theta Chi “VØX” charity talent show, Thwing Ballroom, CWRU.
- 18 Nov 2010: Attended the Choose Ohio First Scholarship dinner, Nord 310, CWRU.
- 5 Nov 2010: Gave an undergraduate advising seminar to Biology faculty, Clapp 405, CWRU.

- 2 Nov 2010: Attended a graduate TA observation seminar for UNIV 400A (Professional Development for Graduate Teaching Assistants), to discuss classroom practices, Nord 310, CWRU.
- Oct 2010: 1st place, Alpha Phi Omega “Ugly Professor Contest” for charity, CWRU.
- Oct 2008: 1st place, Alpha Phi Omega “Ugly Professor Contest” for charity, CWRU.
- 23 Jun 2008: “The virtual classroom environment of a WWW-based autonomous robotics laboratory: Factors affecting student participation, communication, and performance.” Lecture, ASEE National Conference, Pittsburgh, PA. Non-presenting co-author: J.C. Gallagher.
- 11 Mar 2008: Biology Special Award judge, Northeastern Ohio Science and Engineering Fair (NEOSEF), Cleveland State University, Cleveland, OH.
- 23 Feb 2008: Supervised the Robot Ramble competition of the 2008 Science Olympiad, CWRU. About 15 robots from local high schools participated.
- 24 Feb 2007: Supervised the Robot Ramble competition of the 2007 Science Olympiad, CWRU. About 15 robots from local high schools participated.
- Oct 2006: 1st place, Alpha Phi Omega “Ugly Professor Contest” for charity, CWRU.
- 19 Jun 2006: “Comparing a distance-learning and a traditional offering of an autonomous robotics practicum: Lessons and observations.” Poster presentation, ASEE National Conference, Chicago, IL. With J.C. Gallagher.
- 26 Apr 2006: Participated in the Alpha Phi Omega “Jail-n-Bail” for charity.
- 6 Apr 2006: Moderated a discussion table at a Faculty-Student Luncheon, “Current U.S. Immigration Policy”, organized by the Greek Community Educational Consultants, the Order of Omega, and the Greek Life Office, CWRU.
- 25 Feb 2006: Supervised the Robot Ramble competition of the 2006 Science Olympiad, CWRU. About 15 robots from local high schools participated.
- 12 Nov 2005: Gave 10-minute recruiting presentation on behalf of the Biology Department to about 30 prospective freshmen and their families as part of the Get Connected with Case program, Rockefeller 301, CWRU.
- 5 Nov 2005: Gave seminars on scholarship and public relations at the Mid-Year Leadership Challenge, Great Lakes Region, Theta Chi Fraternity, held at CWRU.
- 29 Oct 2005: Gave 10-minute recruiting presentation on behalf of the Biology Department to about 40 prospective freshmen and their families as part of the Get Connected with Case program, Rockefeller 301, CWRU.
- Oct 2005: 2nd place, Alpha Phi Omega “Ugly Professor Contest” for charity, CWRU.
- 6 Oct 2005: “Distance learning approaches to teaching autonomous robotics.” Department of Biology Seminar Series, CWRU.
- 5 May 2005: Read 5 *Uncle Wiggily* short stories by Howard Garis to 2 6th-grade classes at Monticello Middle School, Cleveland Heights, OH, as part of a school-wide Celebrity Reader initiative to promote reading.
- 7 Apr 2005: Moderated a discussion table at a Faculty-Student Luncheon, “Your Best and Worst Teachers

- Ever!”, organized by the Greek Community Educational Consultants, the Order of Omega, and the Greek Life Office, CWRU.
- Mar 2005: Served as one of 5 judges for the Agnar Pytte Cup Award for outstanding fraternity and sorority, Office of Greek Life, CWRU. Duties required evaluating about 20 written applications, most of which were more than 200 pages in length.
- 26 Feb 2005: Supervised the Robot Ramble competition of the 2005 Science Olympiad, CWRU. About 15 robots from local high schools participated.
- 18 Feb 2005: “Supporting engineering practica for undergraduates and STEM educators: An online robotics laboratory.” Poster presentation, NSF Engineering and Computing Education Grantees Meeting, Washington, DC. With J.C. Gallagher.
- 13 Nov 2004: Gave 10-minute recruiting presentation on behalf of the Biology Department to 35 prospective freshmen and their families as part of the Get Connected with Case program, Thwing Ballroom, CWRU.
- 11 Nov 2004: Participated in Biology Majors Gala, discussion table with undergraduates, Hovorka Atrium, CWRU.
- 9 Nov 2004: Read three short stories by Edgar Allan Poe to two 8th-grade classes at Monticello Middle School, Cleveland Heights, OH, as part of a school-wide Celebrity Reader initiative to promote reading.
- 9 Nov 2004: Gave a tour of the autonomous robotics lab to 25 students from Parma High School on campus for the Howard Hughes lecture.
- 4 Nov 2004: Invited panelist for a Faculty Forum on student motivation, hosted by the Greek Life Office, CWRU, and moderated by Provost John Anderson.
- 30 Oct 2004: Gave 10-minute recruiting presentation on behalf of the Biology Department to 35 prospective freshmen and their families as part of the Get Connected with Case program, Thwing Ballroom, CWRU.
- Oct 2004: Winner, Alpha Phi Omega “Ugly Professor Contest” for charity, CWRU.
- 18 Oct 2004: Invited representative of Theta Chi Fraternity Regional Staff at alumni recruiting event, Epsilon Delta Chapter, Youngstown State University, Youngstown, OH.
- 2 Oct 2004: Invited keynote speaker, Ox Roast, Beta Nu Chapter, Theta Chi Fraternity, CWRU.
- 26 May 2004: Gave a demonstration of live *Aplysia* feeding behavior and anatomy to two 2nd-grade classes at Boulevard Elementary School, Cleveland Heights, OH. Prepared and distributed a coloring book about slugs, available online at <http://drushel.cwru.edu/aboutslugs.pdf>
- May 2004: Became a Regional Counselor for Theta Chi Fraternity. Assigned to work with Beta Lambda Chapter (University of Akron) and Delta Tau Chapter (Kent State University). Duties include on-site visits at least once per year.
- 1 Apr 2004: Moderated a discussion table at a Faculty-Student Luncheon, “Gay Marriage: Yes, No, or Maybe?”, organized by the Greek Community Educational Consultants, the Order of Omega, and the Greek Life Office, CWRU.
- 21 Feb 2004: Supervised the Robot Ramble competition of the 2004 Science Olympiad, CWRU. 10 robots from local high schools participated.

- 16 Feb 2004: “Buccal mass kinematics during feeding behaviors in *Aplysia californica*”, presented to BIOL 395 (Research Discussions) class, CWRU.
- 17–18 Jan 2004: Invited alumnus member of Alcohol Free Housing Waiver Review Committee, Theta Chi Fraternity, which met at the Grand Chapter Headquarters in Indianapolis, IN. The Committee reviewed and voted upon 20 applications from Theta Chi Chapters seeking a waiver from the Alcohol Free Housing policy. I was selected by the Grand Chapter from a pool of about 20 alumnus applicants to fill the single Alumnus seat on the Committee.
- 11 Nov 2003: Gave a tour of the autonomous robotics lab to students from Regina High School on campus for the Howard Hughes lecture.
- Oct 2003: 6th place, Alpha Phi Omega “Ugly Professor Contest” for charity, CWRU.
- 26 Sep 2003: Participated in the CWRU Film Society’s *Gong Show* as a joke act; also wrote/arranged musical cues used.
- 18 Aug 2003: Gave a 4-hour autonomous robotics laboratory for incoming freshmen during the Cruisin’ CWRU program for Orientation, CWRU.
- 10 Apr 2003: Moderated a discussion table at a Faculty-Student Luncheon, “The Next 50 Years of Space Exploration”, organized by the Greek Community Educational Consultants, the Order of Omega, and the Greek Life Office, CWRU.
- 4 Apr 2003: “Neural and biomechanical mechanisms of adaptive behavior.” Poster presentation of Abstract 182, Research ShowCASE 2003, CWRU. With G.P. Sutton, D.M. Neustadter, H. Ye, C. Chestek, V. Snyder, and E.M. Mangan.
- 22 Feb 2003: Supervised the Robot Ramble competition of the 2003 Science Olympiad, CWRU. 12 robots from local high schools participated.
- 17 Feb 2003: “Kinematic modelling of the buccal mass of *Aplysia californica*”, presented to BIOL 395 (Research Discussions) class, CWRU.
- 21 Nov 2002: Invited participant in a Faculty-Student Forum to discuss values in the campus Greek system and their relationship to the emerging CWRU institutional values statement, CWRU.
- 12 Nov 2002: Gave a 45-minute tour of the autonomous robotics laboratory to visiting high school students (Lake Ridge Academy), CWRU.
- Oct 2002: Winner, Alpha Phi Omega “Ugly Professor Contest” for charity, CWRU.
- 20 Aug 2002: Orientation lecture, CWRU, “Autonomous Robots, Or, Frankenstein’s Children.”
- 19 Aug 2002: Gave a 4-hour autonomous robotics laboratory for incoming freshmen during the Cruisin’ CWRU program for Orientation, CWRU.
- 15–18 Jul 2002: Gave 2 4-hour autonomous robotics laboratories for incoming freshmen as part of the week-long ACES (Academic and Computer Excellence Seminar) program run by Educational Support Services, CWRU.
- 15 May 2002: Gave 3 30-minute presentations about biological research, with live demonstrations of *Aplysia californica*, to 5 classes of students at Boulevard Elementary School, Cleveland Heights, OH.
- 11 Apr 2002: Moderated a discussion table at a Faculty-Student Luncheon, “8-Bit Microcomputer, Video Game, and Calculator Hacking”, organized by the Greek Community Educational Consultants, the Order

of Omega, and the Greek Life Office, CWRU.

- 25 Mar 2002: “Kinematic modelling of the buccal mass of *Aplysia californica*”, presented to BIOL 395 (Research Discussions) class, CWRU.
- 23 Feb 2002: Supervised the Robot Ramble competition of the 2002 Science Olympiad, CWRU. 13 robots from local high schools participated.
- 17 Feb 2002: Gave 2 tours of the autonomous robotics laboratory to visiting high school students during Engineering Week, CWRU.
- Oct 2001: Winner, Alpha Phi Omega “Ugly Professor Contest” for charity, CWRU.
- 13 Sep 2001: “Teamwork and group dynamics”, presented to the CWRU Battlebots Club.
- 14 Jul 2001: Gave a 6-hour autonomous robotics workshop to ADAMcon 13 (the 13th annual Coleco ADAM computer convention), Cleveland, OH, 12–15 July 2001.
- 29 Jun 2001: Telephone interview for *Travel Holiday Magazine* about LEGO robotics at the Great Lakes Science Center.
- 21 Jun 2001: Gave a talk about my 20-year experience in research at CWRU to the participants of the SPUR program, Department of Biology, CWRU.
- 25 Feb 2001: “Kinematic modelling of the buccal mass of *Aplysia californica*”, presented to BIOL 395 (Research Discussions) class, CWRU.
- 19 Feb 2001: Gave a robot lab tour to a group of high school students competing in the CWRU Engineering Week LEGO Robot Competition, run by the student chapter of the IEEE.
- 7 Feb 2001: Invited observer/judge for Science Symposium at Laurel School, Shaker Heights, OH.
- 9 Dec 2000: Gave public robot demonstrations at Joseph Beth Booksellers, Shaker Heights, OH, as a promotion for the Fall 2000 Egg Hunt in Autonomous Robotics.
- 11 Nov 2000: Gave tours of the autonomous robotics laboratory during Engineering Open House, CWRU.
- Oct 2000: Winner, Alpha Phi Omega “Ugly Professor Contest” for charity, CWRU.
- 22 Aug 2000: Orientation lecture, CWRU, “Autonomous Robots, Or, Frankenstein’s Children.”
- 10–14 Jul 2000: Gave 2 robot mini-courses for incoming freshmen CS/CE students participating in a program through Educational Support Services, CWRU. Each course was 2 hours on 2 days, 20 students per course. They built and programmed autonomous obstacle-avoiding robots from plans designed and written by me.
- 20 May 2000: Gave 1-hour robot demonstration to students at Walsh Jesuit High School, Cuyahoga Falls, OH.
- 30 Apr 2000: The Spring 2000 Egg Hunt for Autonomous Robotics was held at the Great Lakes Science Center, Cleveland, OH. A live webcast of the contest was hosted by discovery.com.
- 4 Nov 1999: Howard Hughes Lecture, CWRU, “Autonomous Robots, Or, Frankenstein’s Children.”
- 22–24 Oct 1999: Invited speaker, Mindfest, a conference on autonomous robotics in education, hosted by the MIT Media Lab, Cambridge, MA.

- 28 May 1999: Hosted the 3rd-grade science class of Bet Zefer Mizrachi, a local private elementary school, during the Spring 1999 Egg Hunt for Autonomous Robotics.
- 6 Mar 1999: Gave a 6-hour LEGO robotics demonstration to visitors at the Hudson Science Fair, Hudson High School, Hudson, OH.
- Oct 1998: 2nd place, Alpha Phi Omega “Ugly Professor Contest” for charity, CWRU.
- 14 Mar 1998: Gave a 3-hour LEGO robotics demonstration to participants of the 5th Annual Northeast Ohio Science and Societal Issues Symposium for High School Students, Department of Biology, CWRU.
- Oct 1997: 3rd place, Alpha Phi Omega “Ugly Professor Contest” for charity, CWRU.
- 18 Sep 1997: “Kinematics and Kinematic Modelling of Swallowing in *Aplysia californica*.” Department of Biology Seminar Series, CWRU.
- Jul 1997: Taught a 5-week version of the Autonomous (LEGO) Robotics course to 3 teachers and 4 middle-school students from the Cleveland School for the Arts. Taught an all-day LEGO robotics class to a group of 15 local high school science teachers, which included constructing and operating a LEGO version of NASA’s Mars Sojourner rover, designed using materials from NASA’s website. Gave the keynote address to the students graduating from the summer Minority Educational Opportunities Program (MEOP).
- Spring 1997: Gave more than 10 LEGO robot presentations to visiting elementary school students, high school students, middle school teachers, CWRU alumni, and CWRU administrators.
- 6 Nov 1996: Gave 6 1-hour presentations about the BIOL 479 LEGO robot course to students and faculty at Liberty High School, Youngstown, OH. Students were from grades 9–12, representing classes in mathematics, biology, chemistry, computer programming, English literature and composition.
- 25 Oct 1996: As part of CWRU’s annual President’s Weekend, gave (with Dr. Randy Beer and Dr. Hillel Chiel) a presentation about the BIOL 479 LEGO robot course to an audience of CWRU officials, members of the Board of Trustees, and corporate and private donors. This included a demonstration of a student-built Egg Hunt robot from the Fall 1996 semester.
- 19–21 Jul 1996: Prepared and staffed an exhibit at the Cleveland Bicentennial Celebration, about the BIOL 479 LEGO robot course. Featured in a live television interview and robot demonstration for WKYC-TV Channel 3, Cleveland, OH at 9:35 AM 21 July 1996.
- 17 Nov 1994: “Static- and Dynamic-Radula/Odontophore Kinematic Models of the Buccal Mass of *Aplysia californica*.” Poster presentation of Abstract 653.19, Society for Neuroscience 24th Annual Meeting, Miami, Florida. With P.E. Crago and H.J. Chiel.
- 20 Jan 1994: “Kinematics and Three-Dimensional Anatomy of the Buccal Mass of *Aplysia californica*.” Department of Biology Seminar Series, CWRU.
- 11 Nov 1993: “The Muscular Hydrostatic Structure of the Buccal Mass of *Aplysia californica*.” Poster presentation of Abstract 657.1, Society for Neuroscience 23rd Annual Meeting, Washington, D.C. With H.J. Chiel and P.E. Crago.
- 2 Apr 1993: “Three-Dimensional Image Analysis of *Aplysia* Buccal Mass Musculature.” Applied Neural Control Laboratory Seminar Series, Department of Biomedical Engineering, CWRU.

17. Invited Reviews and Other Consulting Work.

- Apr 2006: Assembled a public webpage containing elementary school enrollment, demographics, cost, and student performance data in the Cleveland Heights-University Heights school district. Presented these data at a Board of Education meeting on 10 Apr 2006. The webpage is available for inspection at <http://drushel.cwru.edu/chuh/analysis/analysis.html>
- Feb 2003: Submitted a stereoscopic imaging technique (used in my own research) to the Columbia Accident Investigation Board (CAIB), which was formed to determine the cause of the space shuttle STS-107 *Columbia* accident. E-mail received from the CAIB on 21 April 2003 confirmed that my submission was accepted as valid, and, thus, the Imagery Science and Analysis Group of the CAIB actually performed my suggested analysis. The E-mail exchanges are currently available for inspection at http://drushel.cwru.edu/rfd_caib.html
- 2001–2002: Paid consultant, reviewer, and evaluator of an NSF-funded, web-based autonomous robotics class, CSC 390, developed by Dr. John C. Gallagher, Wright State University, Dayton, OH.
- Mar 2000: Invited reviewer of revised LEGO robotics textbook by Dr. Fred Martin, MIT Media Lab.
- Mar 1999: Invited by Prentice Hall to review the manuscript of the 6th edition of Hill, Baum, and Scott-Ennis, *Chemistry and Life*, a chemistry/biochemistry textbook for nursing students.
- May 1997/8: Invited by Addison-Wesley Publishing to review a textbook on LEGO robotics by Dr. Fred Martin, MIT Media Lab.

18. Laboratory Skills.

Tissue culture, light microscopy, microtomy, transmission electron microscopy (thin sections and rotary shadowing), immunohistochemistry, 3-dimensional reconstruction from serial sections, vertebrate and invertebrate dissection.

19. Computer Skills.

Platforms and Operating Systems: Win95/NT/98Me/2K/XP/Vista/7, Apple MacOS 6/7/8/9/X, Unix, MS-DOS 80x86, Coleco ADAM, CP/M, DEC pdp-11/34.

Programming Languages: Extensive experience in Microsoft BASIC/GW-BASIC/QuickBASIC and other BASIC dialects (AppleSoft, BASIC-11). Proficient in Java, C, some experience with FORTRAN and IDL. Expert in Z80 assembly language, proficient in 80x86 and 6801/6811 assembly languages.

Webpage Design: Proficient in platform-independent HTML (3.2, 4.01 transitional).

Graphics Software Packages: Canvas, Adobe Photoshop.

Software Design: I have written a variety of data analysis programs to study Biology major enrollment trends, for tracking and strategic planning purposes. These are written in QuickBASIC 4.5 and run under an emulated MS-DOS 6.22 environment (RealPC for MacOS 9, or DOSBox for MacOS X).

While a researcher in Hillel Chiel's lab, I wrote software (using compiled QuickBASIC 4.5 on 80386 and 80486 systems) to perform voxel-based three-dimensional reconstructions from serial cross sections, incorporating true vanishing-point perspective and the ability to view the reconstructed volume from any degree of rotation about the 3 Cartesian axes. Source images are greyscaled TIFF files captured with a video camera and processed with commercial graphics software.

I have also implemented a kinematic model of the *Aplysia* buccal mass during feeding behavior in QuickBASIC 4.5, based upon a preliminary version in C, published in Drushel *et al.* (1998).

I wrote plotting and display programs which were used in Biology 315/415 (Quantitative Biology Laboratory) from 1986–1990: XYPLOT, a point/line plotting program; HISTOG, a histogram analysis program, and DISPLAY, used to retrieve/print graphical output saved from XYPLOT and HISTOG. These programs were written in Microsoft BASIC for an IBM-PC/XT computer network.

For my hobby computer, the 1983 Coleco ADAM, I have written and patched application programs in Z80 assembly language, including a SmartBASIC programming language interpreter, a telecommunications program, and a color graphics painting program. Some of these programs existed only as binaries, for which I regenerated source code by disassembly. I served as the head of the design team for a revised EOS operating system for the ADAM. I have extensive experience in writing low-level device drivers for serial ports, parallel ports, hard disks, and other peripheral devices. I have chaired two Cleveland ADAMcons: XIII (12–15 July 2001) and XXVI (17–20 July 2014).

20. Other Skills.

Medical and technical illustration and drawing; cartooning; electronic hardware design and troubleshooting.

21. Non-Professional Organizations.

- 2013–date: Lead alto saxophone player in Gabriel’s Horns, a 21-piece jazz band directed by James May, Jr., Cleveland, OH.
- 2004–2012: Regional Counselor, Theta Chi Fraternity. Ohio Valley Region (2006–2012). Great Lakes Region (2004–2006). The Regional Counselor program was discontinued on 30 June 2012.
- 2002–date: Faculty Advisor, CWRU Film Society.
- 1998–date: Faculty Advisor, Beta Nu Chapter, Theta Chi Fraternity, CWRU.
- 1980–1987: CWRU Bands (Marching, Concert, Jazz Ensemble II). Served as Drum Major 1983–1985. Primary instrument: Alto saxophone.
- 1983–1984: Beta Nu Chapter, Theta Chi Fraternity, CWRU. Held elected offices of Chaplain and Librarian.