



Date and Place of Birth: October 22, 1956
Worcester, MA

Citizenship: U.S.A.

Home Address and Telephone: 2502 Booker Creek Road
Chapel Hill, NC 27514-5118

Cell: 919-967-1902

Business Address and Telephone: Department of Radiation Oncology
UNC School of Medicine, CB#7512
Chapel Hill, NC 27599-7512

Phone: 919-843-7590
FAX: 984-974-8607

E-Mail: elaine_zeman@med.unc.edu
madam_curie@mac.com

Twitter: @DrZeman

Educational Background:

1978 A.B., Biological and Medical Sciences
Brown University, Providence, RI

1985 Ph.D., Cellular and Molecular Radiation Biology
Colorado State University, Fort Collins, CO

Professional Experience:

2008 – present (50% time)

Research Associate Professor
 Department of Radiation Oncology
 University of North Carolina School of Medicine
 Chapel Hill, NC

Associate Residency Program Director
 Department of Radiation Oncology
 University of North Carolina School of Medicine
 Chapel Hill, NC

Administrative Director, UNC Health Care Radiation Therapy and
 Medical Dosimetry Certificate Programs

Freelance Educator
Raw Data Services
 Expert Teaching in Radiation and Cancer Biology
 Chapel Hill, NC

2005 – 2007 (50% time)

Research Associate Professor
 Department of Radiation Oncology
 University of North Carolina School of Medicine
 Chapel Hill, NC

Freelance Educator
Raw Data Services
 Expert Teaching in Radiation Biology
 Chapel Hill, NC
<http://www.rawdata-services.com>

1994 – 2004 (50% time)

Research Assistant Professor
 Department of Radiation Oncology
 University of North Carolina School of Medicine
 Chapel Hill, NC

Founder, *Raw Data Services*
 Expert Teaching in Radiation Biology
 Chapel Hill, NC

1989 – 1994

Assistant Professor
 Department of Radiation Oncology
 Division of Molecular Radiobiology
 University of North Carolina School of Medicine
 Chapel Hill, NC

Member
 Lineberger Comprehensive Cancer Center
 University of North Carolina School of Medicine
 Chapel Hill, NC

1985 – 1988	Postdoctoral Research Associate Department of Radiation Oncology Division of Radiation Biology Stanford University School of Medicine Stanford, CA
1980 – 1985	Predoctoral Graduate Student Department of Radiology and Radiation Biology Colorado State University Fort Collins, CO
1978 – 1980	Research Assistant Department of Radiation Oncology, Radiobiology Section Rhode Island Hospital Providence, RI
1976 – 1978 (30% time)	Research Assistant Department of Radiation Oncology, Medical Physics Section Rhode Island Hospital Providence, RI

Honors and Awards:

1978	Graduated <i>magna cum laude</i> , Brown University
1983	Radiation Research Society Student Travel Award to 31st Annual Meeting, San Antonio, TX
1983 – 1984	Colorado Graduate Fellowship (full scholarship)
1985	Radiation Research Society Student Travel Award to 33rd Annual Meeting, Los Angeles, CA
1985	Young Investigator Travel Award to Fifth Chemical Modifiers of Cancer Treatment Meeting, Clearwater, FL
1986	Young Investigator Travel Award to The Interaction of Radiation Therapy and Chemotherapy Conference, Williamsburg, VA
1987	Young Investigator Travel Award to the Eighth International Congress of Radiation Research, Edinburgh, Scotland
1988	Young Investigator Travel Award to the Sixth Chemical Modifiers of Cancer Treatment Meeting, Paris, France
2008	2007-2008 Resident Educator of the Year Award, American Association of Residents in Radiation Oncology
2009	Induction into the UNC School of Medicine Academy of Educators

2012, 2013 Special commendation as "Lecturer of the Year" in PATH 725, Cancer Pathobiology, UNC School of Medicine

2014, 2016 – 2019 Highest rated lecturer, Annual University of Maryland Radiation Biology and Physics Review Course, Baltimore, MD

Teaching Expertise:

Cellular and molecular radiation biology
 Clinical radiation biology
 Cancer/tumor biology
 Radiation histopathology and toxicology
 Clinical radiation oncology
 Radiation and public health
 History of radiation biology and oncology

Related Areas of Expertise:

Scientific writing, editing, proofreading and publishing
 Public speaking/teaching in the biomedical sciences
 Standardized testing/item development

Society Memberships:

American Society for Radiation Oncology
 American Society of Radiologic Technologists
 Radiation Research Society
 Society of Sigma Xi

Committees and Offices:

1982 – 1983 Chair, Graduate Student Seminar Committee, Department of Radiology and Radiation Biology, Colorado State University

1983 – 1985 Graduate Student Representative to Departmental Faculty Meetings, Department of Radiology and Radiation Biology, Colorado State University

1989 – 1991 Member, Annual Meeting Site Selection and Policy Committee, Radiation Research Society

1990 – 1993 Abstract Reviewer for Annual Meeting and Program Committee, American Society for Radiation Oncology

1991 – 1992 Member, Annual Meeting Program Committee, Radiation Research Society

1991 – 1994 Chair, Annual Meeting Site Selection and Policy Committee, Radiation Research Society

1991 – 1995	Radiation Biology Task Force for New Question Development, Annual Written Board Examination in Radiation Oncology, American Board of Radiology
1995 – 1997	Member, Fundraising Committee, Radiation Research Society
1999 – 2001	Member, Education and Training Committee, Radiation Research Society
2000 – 2003	Member, Annual Meeting Program Advisory Committee, American Society for Radiation Oncology
2001 – 2006	Member, Joint Working Group on Radiobiology Teaching, American Society for Radiation Oncology
2001 – 2007	Member, TXIT Subcommittee on Radiation Biology Question Development, Annual In-Training Examination for Radiation Oncology, American College of Radiology
2001 – 2004	Co-Chair, Education and Training Committee, Radiation Research Society
2002 – present	Member, Department of Radiation Oncology Program Evaluation Committee, UNC School of Medicine
2003 – 2004	Member, Annual Meeting Program Committee, Radiation Research Society
2005 – 2011	Senior Associate Editor, annual <i>ASTRO Radiation/Cancer Biology Practice Exam and Study Guide</i> , Curriculum and Teaching Subcommittee of the Radiation and Cancer Biology Committee, American Society for Radiation Oncology
2005 – 2006	Member, Program Committee, 13 th International Congress of Radiation Research and 2007 San Francisco Radiation Oncology Conference
2008 – 2014	Biology Panel Chair, TXIT Executive Committee for Question Development, Annual In-Training Examination for Radiation Oncology, American College of Radiology
2008 – present	Member, Department of Radiation Oncology Resident Clinical Competency Committee, UNC School of Medicine
2009 – present	Fellow, UNC School of Medicine Academy of Educators
2016 – present	Member, Department of Radiation Oncology Educational Programs Oversight Committee, UNC School of Medicine

2019 – present Member, Association for Directors of Radiation Oncology Programs, American Society for Radiation Oncology

Teaching Experience:

1983 – 1985 Biology 702B - Advanced Methods in Biological Sciences: Cell Culture Techniques; Department of Radiology and Radiation Biology, Colorado State University

1986 – 1988 Radiology 202 - Radiobiology Lecture Series; Department of Radiation Oncology, School of Medicine, Stanford University

1989 – present Radiation and Cancer Biology Lecture Series for Residents; Department of Radiation Oncology, School of Medicine and UNC Hospitals, University of North Carolina

1990 – 1997 Current Topics in Radiation Biology and Therapy; Biomedical Sciences Selective Program, School of Medicine, University of North Carolina

1991 – 1996 Environmental Sciences 168/Oral Radiology 190 - Comprehensive Radiation Biology (Module on "Cellular Radiation Biology"); Schools of Dentistry and Public Health, University of North Carolina

1991 Dentistry 464E - Clinical Cancer (Lecture on "Radiation Biology and Therapy"); School of Dentistry, University of North Carolina

1992 – present Toxicology 707 - Advanced Toxicology (Module on "Radiation Toxicology"); Schools of Medicine and Public Health, and Curriculum in Toxicology, University of North Carolina

1994 – present Freelance radiobiology teaching for radiation oncology residents, cancer biology graduate students and medical physicists on a fee-for-service basis. Past and present clients include the following academic institutions: University of Virginia Health Sciences Center, Charlottesville, VA; University of Washington School of Medicine, Seattle, WA; Medical College of Wisconsin, Milwaukee, WI; Mayo Clinic, Rochester, MN, Jacksonville, FL and Scottsdale, AZ; Wake Forest University School of Medicine, Winston-Salem, NC; University of Texas Medical Branch, Galveston, TX; University of Tennessee Health Science Center, Memphis, TN; University of Mississippi Medical Center, Jackson, MS; University of Alabama School of Medicine, Birmingham, AL; and University of Maryland School of Medicine, Baltimore, MD

1995 – 2003 Radiologic Science 76 – The Radiobiology of Radiation Therapy; Division of Radiologic Science, Department of Allied Health Sciences, School of Medicine, University of North Carolina

2000 – 2007	Radiologic Science 585 – Radiological Health Physics (Module on “Radiation Biology and Protection”); Division of Radiologic Science, Department of Allied Health Sciences, School of Medicine, University of North Carolina
2002	Radiologic Science 32 – Concepts and Perspectives in Radiologic Sciences (Module on “Radiation Biology and Protection”); Division of Radiologic Science, Department of Allied Health Sciences, School of Medicine, University of North Carolina
2003 – 2007	Radiologic Science 323 – Radiation Biology and Protection for Radiographers (Module on “Cell and Tissue Radiobiology”); Division of Radiologic Science, Department of Allied Health Sciences, School of Medicine, University of North Carolina
2004 – present	The Radiobiology of Radiotherapy – certificate-level course for radiation therapy and medical dosimetry trainees; UNC Hospitals Schools of Radiation Therapy and Medical Dosimetry
2005 – present	Pathology 725 – Cancer Pathobiology (Lecture on “Radiation Oncology and Biology”); Department of Pathology and Laboratory Medicine, School of Medicine, University of North Carolina
2010 – present	Introduction to the Radiobiology of Radiotherapy – orientation lecture given to medical students and other oncology residents and fellows rotating through the UNC Department of Radiation Oncology (5-10 lectures per year)
2011 – present	Cancer Biology and Oncology for Radiation Therapy – certificate-level course for radiation therapy and medical dosimetry trainees; UNC Hospitals Schools of Radiation Therapy and Medical Dosimetry
2014 – present	Invited faculty lecturer at the Annual University of Maryland Radiation Biology and Physics Review Course
2014 – present	Biomedical Engineering 900 – Independent Study: Radiation and Cancer Biology; Department of Biomedical Engineering, School of Medicine, University of North Carolina (<i>Mechanism established to allow aspiring medical physicists to obtain course credit for attending the hospital-based radiation and cancer biology course for residents</i>)

Research:

1989 – 1991	American Cancer Society Role: Principal Investigator Institutional Grant for Cancer Research, #1N-15-3 "Proliferative and Oxygenation Status in Spontaneous Canine Tumors: An Immunohistochemical Approach"
-------------	--

1991 – 1994	National Institutes of Health Role: Principal Investigator NCI Grant #1R29-CA53516 "Radiation-Induced Perturbations of Cell Cycle Transit"
1992 – 1994	Sphinx Pharmaceuticals Corporation Role: Principal Investigator Cost Reimbursement Contract "Pilot Study of Protein Kinase C Inhibitors' Effects on Tumor Cell Radiosensitivity"
2009 – 2013	National Institutes of Health Role: Co-Investigator NCI Grant #5R25-CA134307 "Curriculum and Modules for Computer-Based Instruction in Medical Dosimetry"
2010 – present	National Institutes of Health Role: External Advisor NCI Grant #1R25-CA140116 "Summer Undergraduate Program to Educate Radiation Scientists (SUPERS)"

Students Supervised:

1994	Laboratory research project advisor for Ms. Sheila Lovell, certificate level radiation therapy student, "An <i>In Vitro</i> Cell Survival Curve". Winner of the annual Siemens Corporation Therapy Student Research Award, and a First Place award at the annual meeting of the North Carolina Society of Radiologic Technologists.
2003	Research paper advisor for Ms. Jennifer Daniel, baccalaureate level radiation therapy student, "CHART for Head and Neck Cancer: Biological Considerations and Implementation Issues for the United States". Research paper advisor for Ms. Shannon Lange, baccalaureate level radiation therapy student, "Emerging Roles of Radiobiology and Molecular Biology in Radiation Oncology Practice".
2013	Research paper advisor for Ms. Jessica Moon, certificate level radiation therapy student, "A Future Role for Stem Cells as a Regenerative Therapy for Radiation-Induced Normal Tissue Damage?"
2014 - 2019	<i>Ad hoc</i> radiation biology research advisor for two UNC Biomedical Engineering graduate students, Dr. Soha Bazayr and Ms. Judith Rivera.

Professional Development:

UNC Academy of Educators and Graduate Medical Education Lecture Series, Grand Rounds and Workshops:

October 24, 2012: Dan Hunt, MD, MBA, *"Is UNC School of Medicine ready for curricular change? Factors to consider"*

November 14, 2012: Amy Weil, MD, *"Teaching through a critical incident curriculum"*

February 20, 2013: Todd Zakrajsek, PhD, *"Evidence-informed teaching: Resources to enhance the learning experience"*

March 20, 2013: Kelly Dore, PhD, *"Issues of assessment: What works and why?"* (Wilson Lectureship on Medical Professionalism)

April 10, 2013: Phil Gruppuso, MD, *"Medical education as continuum: Brown's programs in liberal medical education and primary care-population health"*

October 24, 2013: Kevin Biese, MD, *"Residents as teachers"*

March 25, 2014: Kelly Hogan, PhD, *"The active and engaged large class: Evidence and strategies"*

June 24, 2014: Todd Zakrajsek, PhD, *"Strategies for developing metacognition skills in learners"*

March 3, 2015: Workshop and open discussion: *"Integrating basic science and clinical science: How do we do it? Do we need to 'teach the teachers'?"*

October 20, 2015: *"The Autopsy of Dr. Melinda J. Smith"*, an interactive, multimedia theater presentation developed that focused on the changing nature of graduate medical education, in particular how issues of professional identity and mistreatment interact with pedagogical development and the institutional learning environment.

September 28, 2016: Amy Weil, MD, *"Burnout and wellness: Finding a path to resiliency"*

October 26, 2016: Kerri Palamara, MD, *"Enough about burnout: Let's talk about emotional wellbeing and the role of coaching"*

January 24, 2017: Sophia Paraschos, MD, Kenton Dover, MD, Emily Holmes, MD and Alison Raybould, MD, *"Resident Wellness: Preventing and Treating Resident Burnout - An Update"*

March 5, 2018: Neva Howard, MD, MS, Deborah Ingersall, PhD, Alice D. Ma, MD and Allison Schad, LCSWA, LCASA, *"Supporting struggling students"*

October 17, 2018: Anne Phibbs, PhD, *"From authority to ally: Making a difference for diversity and inclusion"*

February 18, 2019: Sten Swenson and Kurt Gilliland, *"Use of medical education technology at UNC"*

April 23, 2019: Lindsay Wilson, MD, MPH, FACP, *"Sharing our stories to reach our learners"*

June 21, 2019: Jeffrey S. Kneisl, MD, FACS, "Successful career transitions in medicine: Predicting vs. planning vs. preparing"

August 2, 2019: Sydney Primis, MD, Amy Boardman, MD, and Cameron Davis, MA, "Writing effective letters of recommendation"

BIBLIOGRAPHY

Published Papers (refereed):

1. DeWyngaert, J.K., J.T. Leith, R.A. Peck, Jr., S.F. Bliven, **E.M. Zeman**, S.A. Marino and A.S. Glicksman. Differential RBE values obtained for mammary adenocarcinoma tumor cell subpopulations after 14.8 MeV neutron irradiation. *Radiat Res* 88: 118-131, 1981. [PMID: 7302122](#).
2. Leith, J.T., D.L. Dexter, J.K. DeWyngaert, **E.M. Zeman**, M.Y. Chu, P. Calabresi and A.S. Glicksman. Differential responses to X-irradiation of subpopulations of two heterogeneous human carcinomas *in vitro*. *Cancer Res* 42: 2556-2561, 1982. [PMID: 7083148](#).
3. **Zeman, E.M.** and J.S. Bedford. Changes in early and late effects with dose-per-fraction: Alpha, beta, redistribution and repair. *Int J Radiat Oncol Biol Phys* 10: 1039-1047, 1984. [PMID: 6746344](#).
4. **Zeman, E.M.** and J.S. Bedford. Dose-rate effects in mammalian cells: V. Dose fractionation effects in noncycling C3H 10T1/2 cells. *Int J Radiat Oncol Biol Phys*. 10: 2089-2098, 1984. [PMID: 6490434](#).
5. **Zeman, E.M.** and J.S. Bedford. Dose fractionation effects in plateau phase cultures of C3H 10T1/2 cells and their transformed counterparts. *Radiat Res* 101: 373-393, 1985. [PMID: 3975362](#).
6. **Zeman, E.M.** and J.S. Bedford. Patterns of cell loss and repopulation in irradiated cultures of plateau phase C3H 10T1/2 cells. *Radiother Oncol* 4: 71-85, 1985. [PMID: 4035004](#).
7. **Zeman, E.M.** and J.S. Bedford. Loss of repair capacity in density-inhibited cultures of C3H 10T1/2 cells during multifraction irradiation. *Radiat Res* 104: 71-77, 1985. [PMID: 4048395](#).
8. **Zeman, E.M.** and J.S. Bedford. Co-cultured transformed and untransformed C3H 10T1/2 cells: Preferential killing of transformed cells by low dose rate irradiation. *Int J Radiat Oncol Biol Phys* 12: 51-58, 1986. [PMID: 3943992](#).
9. **Zeman, E.M.**, J.M. Brown, M.J. Lemmon, V.K. Hirst and W.W. Lee. SR 4233: A new bioreductive agent with high selective toxicity for hypoxic mammalian cells. *Int J Radiat Oncol Biol Phys* 12: 1239-1242, 1986. [PMID: 3744945](#).
10. **Zeman, E.M.**, V.K. Hirst, M.J. Lemmon and J.M. Brown. Enhancement of radiation-induced tumor cell killing by the hypoxic cell toxin SR 4233. *Radiother Oncol* 12: 209-218, 1988. [PMID: 3175048](#).
11. Baker, M.A., **E.M. Zeman**, V.K. Hirst and J.M. Brown. Metabolism of SR 4233 by Chinese hamster ovary cells: Basis of selective hypoxic cytotoxicity. *Cancer Res* 48: 5947-5952, 1988. [PMID: 3167847](#).
12. **Zeman, E.M.** and J.M. Brown. Pre- and post-irradiation radiosensitization by SR 4233. *Int J Radiat Oncol Biol Phys* 16: 967-971, 1989. [PMID: 2703404](#).

13. **Zeman, E.M.**, M.A. Baker, M.J. Lemmon, C.I. Pearson, J.A. Adams, J.M. Brown, W.W. Lee and M. Tracy. Structure-activity relationships for benzotriazine di-N-oxides. *Int J Radiat Oncol Biol Phys* 16: 977-981, 1989. [PMID: 2703405](#).
14. **Zeman, E.M.**, M.J. Lemmon and J.M. Brown. Aerobic radiosensitization by SR 4233 *in vitro* and *in vivo*. *Int J Radiat Oncol Biol Phys* 18: 125-132, 1990. [PMID: 2298615](#).
15. **Zeman, E.M.**, C.I. Pearson and J.M. Brown. Induction of hypoxia in glass versus permanox petri dishes. *Radiat Res* 122: 72-76, 1990. [PMID: 2320727](#).
16. **Zeman, E.M.** and J.M. Brown. Aerobic radiosensitization by SR 4233 in rodent and human cells: Mechanistic and therapeutic implications. *Int J Radiat Biol* 59: 117-131, 1991. [PMID: 1671059](#).
17. Raleigh, J.A., **E.M. Zeman**, M. Rathman, J.K. LaDine, J.M. Cline and D.E. Thrall. Development of an ELISA for the detection of 2-nitroimidazole hypoxia markers bound to tumor and normal tissue. *Int J Radiat Oncol Biol Phys* 22: 403-405, 1992. [PMID: 1310494](#).
18. Moore, D.H., M.B. Rouse, G.S. Massenburg and **E.M. Zeman**. Description of a spheroid model for the study of radiation and chemotherapy effects on hypoxic tumor cell populations. *Gynec Oncol* 47: 44-47, 1992. [PMID: 1427399](#).
19. **Zeman, E.M.**, D.P. Calkins, J.M. Cline, D.E. Thrall and J.A. Raleigh. The relationship between proliferative and oxygenation status in spontaneous canine tumors. *Int J Radiat Oncol Biol Phys* 27: 891-898, 1993. [PMID: 8244820](#).
20. Raleigh, J.A., **E.M. Zeman**, D.P. Calkins, M.C. MacEntee and D.E. Thrall. Distribution of hypoxia and proliferation associated markers in spontaneous canine tumors. *Acta Oncol* 34 (3): 345-349, 1995. [PMID: 7779421](#).
21. Blackstock, A.W., L. Kwok, C. Branch, **E.M. Zeman** and J.E. Tepper. Tumor retention of 5-fluorouracil following irradiation observed using ^{19}F nuclear magnetic resonance spectroscopy. *Int J Radiat Oncol Biol Phys* 36: 641-648, 1996. [PMID: 8948349](#).
22. Dynlacht, J.R., M.W. Dewhirst, E.J. Hall, B.S. Rosenstein and **E.M. Zeman**. Toward a consensus on radiobiology teaching to radiation oncology residents. *Radiat Res* 157: 599-606, 2002. [PMID: 11966327](#).
23. **Zeman, E.M.**, J.R. Dynlacht, B.S. Rosenstein and M.W. Dewhirst. Toward a national consensus: Teaching radiobiology to radiation oncology residents. *Int J Radiat Oncol Biol Phys* 54: 861-872, 2002. [PMID: 12377340](#).
24. Coleman, C.N., H.B. Stone, G.A. Alexander, M.H. Barcellos-Hoff, J.S. Bedford, R.G. Bristow, J.R. Dynlacht, Z. Fuks, L.S. Gorelic, R.P. Hill, M.C. Joiner, F.F. Liu, W.H. McBride, W.G. McKenna, S.N. Powell, M.E.C. Robbins, S. Rockwell, P.B. Schiff, E.G. Shaw, D.W. Siemann, E.L. Travis, P.E. Wallner, R.S.L. Wong and **E.M. Zeman**. Education and training for radiation scientists: Radiation Research Program and American Society of Therapeutic Radiology and Oncology Workshop, Bethesda, Maryland, May 12-14, 2003. *Radiat Res* 160: 729-737, 2003. [PMID: 14640790](#).

25. Pusey, D., L. Smith, **E. Zeman** and R. Adams. A history and overview of the certification exam for medical dosimetrists. *Med Dosim* 30: 92-96, 2005. [PMID: 15922175](#).
26. Dynlacht, J.R. and **E.M. Zeman**. Recent initiatives for radiation oncology resident education in radiation and cancer biology. *Radiat Res* 168: 262-265, 2007. [PMID: 17722362](#).
27. Rosenstein, B.S., K.D. Held, S. Rockwell, J. Williams and **E.M. Zeman**. American Society of Radiation Oncology (ASTRO) survey of radiation biology educators in U.S. and Canadian radiation oncology residency programs. *Int J Radiat Oncol Biol Phys* 75: 896-905, 2009. [PMID: 19733012](#).
28. Church J., W. Hannum, E. Schreiber, **E.M. Zeman**, M. Kostich and R.D. Adams. DOSE: Dosimetry online supplemental education. *Radiat Ther* 24(2): 197-201, 2015.
29. Dynlacht J.R., **E.M. Zeman**, K. Held, J. Deye, B. Vikram and M.C. Joiner. Education and training needs in the radiation sciences: Problems and potential solutions. *Radiat Res* 184: 449-455, 2015. [PMID: 26479274](#).

Other Publications (non-refereed):

1. **Zeman, E.M.** US radiation oncology resident education in radiation biology: Time for a reappraisal? EURADNEWS, online newsletter of the European Late Effects Project Group and the European Radiation Dosimetry Group. Special issue on "Training and Education in the Radiological Sciences", Number 12, November, 2002 (ISSN 1627-3699).
2. Rosenstein, B.S., Editor-in-Chief; K. Held, S. Rockwell, **E. Zeman**, Senior Associate Editors; J. Allalunis-Turner, A. Haimovitz-Friedman, A. Kronenberg, W. Morgan, J. Murnane, C. Stevens, J. Sweasy, J. Williams, Associate Editors. *RABEX 2005: Radiation and Cancer Biology Practice Examination*. Advanced Medical Publishing, Madison, 2005.
3. Rosenstein, B.S., Editor-in-Chief; K. Held, S. Rockwell, J. Williams and **E. Zeman**, Senior Associate Editors. *2006 ASTRO Radiation and Cancer Biology Practice Examination and Study Guide*.
4. Rosenstein, B.S., Editor-in-Chief; K. Held, S. Rockwell, J. Williams and **E. Zeman**, Senior Associate Editors. *2007 ASTRO Radiation and Cancer Biology Practice Examination and Study Guide*.
5. Rosenstein, B.S., Editor-in-Chief; K. Held, S. Rockwell, J. Williams and **E. Zeman**, Senior Associate Editors. *2008 ASTRO Radiation and Cancer Biology Practice Examination and Study Guide*.
6. Rosenstein, B.S., Editor-in-Chief; K. Held, S. Rockwell, J. Williams and **E. Zeman**, Senior Associate Editors. *2009 ASTRO Radiation and Cancer Biology Practice Examination and Study Guide*.
7. Rosenstein, B.S., Editor-in-Chief; S. Rockwell, J. Williams and **E. Zeman**, Senior Associate Editors. *2010 ASTRO Radiation and Cancer Biology Practice Examination and Study Guide*.
8. Rosenstein, B.S., Editor-in-Chief; **E. Zeman**, Contributor. *2011 ASTRO Radiation and Cancer Biology Practice Examination and Study Guide*.
9. Eblan M.J., N.A. VanderWalde, **E.M Zeman** and E. Jones. Hypofractionation for breast cancer: lessons learned from our neighbors to the north and across the pond. *Oncology (Williston Park)* 28(6):536-546, 2014. [PMID: 25134333](#).

10. **Zeman, E.M.** Book review: *Radiobiology Self-Assessment Guide*. *Int J Radiat Biol* 93(7): 740-741, 2017. [PMID: 28409667](#).

Book Chapters:

1. **Zeman, E.M.** The Biological Basis of Radiation Oncology. In Gunderson, L.L. and Tepper, J.E. (eds): *Clinical Radiation Oncology*. Churchill Livingstone, Harcourt Health Sciences, Philadelphia, 2000, pp. 1-41.
2. **Zeman, E.M.** The Biological Basis of Radiation Oncology. In Gunderson, L.L. and Tepper, J.E. (eds): *Clinical Radiation Oncology, Second Edition*. Churchill Livingstone, Philadelphia, 2006, pp. 1-43.
3. **Zeman, E.M.** The Biological Basis of Radiation Oncology. In Gunderson, L.L. and Tepper, J.E. (eds): *Clinical Radiation Oncology, Third Edition*. Saunders, Philadelphia, 2011, pp. 3-42.
4. **Zeman, E.M.**, E.C. Schreiber and J.E. Tepper. Basics of Radiation Therapy. In Abeloff, M.D., Armitage, J.O., Niederhuber, J.E., Kastan, M.B. and McKenna, W.G. (eds): *Abeloff's Clinical Oncology, Fifth Edition*. Churchill Livingstone, Philadelphia, 2014, pp. 393-422.
5. **Zeman, E.M.** The Biological Basis of Radiation Oncology. In Gunderson, L.L. and Tepper, J.E. (eds): *Clinical Radiation Oncology, Fourth Edition*. Saunders, Philadelphia, 2016, pp. 2-40.
6. **Zeman, E.M.** The History and Radiobiology of Hypofractionation. In Kaidar-Person, O. and Chen R.C. (eds): *Hypofractionated and Stereotactic Radiation Therapy: A Practical Guide*. Springer International Publishing AG, Cham, Switzerland, 2018, pp. 1-31.
7. **Zeman, E.M.**, E.C. Schreiber and J.E. Tepper. Basics of Radiation Therapy. In Abeloff, M.D., Armitage, J.O., Niederhuber, J.E., Kastan, M.B. and McKenna, W.G. (eds): *Abeloff's Clinical Oncology, Sixth Edition*. Churchill Livingstone, Philadelphia, 2019, pp. 431-460.
8. **Zeman, E.M.** The Biological Basis of Radiation Oncology. In Gunderson, L.L. and Tepper, J.E. (eds): *Clinical Radiation Oncology, Fifth Edition*. Saunders, Philadelphia, in press, 2019.

Meeting Abstracts/Invited Presentations (Recent):

1. Invited Faculty Educational Lecture, "Basic Molecular, Cellular and Tumor Biology of Cancer: A Physicist's Introduction". Presented at the 52nd Annual Meeting of the American Association of Physicists in Medicine, Philadelphia, PA, July 20, 2010.
2. Symposium Presentation, "Development of a Web-based Dosimetry Training Tool for Therapy and Dosimetry Education", E. Schreiber, W. Hannum, **E. Zeman**, M. Kostich, G. Tracton, J. Church, R. Dean, R. Adams. Presented at the 54th Annual Meeting of the American Association of Physicists in Medicine, Charlotte, NC, August 1, 2012. *Winner of the 2012 AAPM Innovations in Medical Physics Education Award*.
3. Invited Speaker, "Radiation-Induced DNA Damage and Repair and Chromosome Aberrations", and "Radiation-Induced Hereditary and Teratogenic Effects and Radiation Protection Standards" Presented at the 12th Annual University of Maryland Radiation Physics and Radiobiology Review Course, Baltimore, MD, May 2-4, 2014. *Highest rated lecturer*.

4. Invited Workshop Speaker, "Radiation and Cancer Biology Educator Surveys Revisited: What has Changed?" Presented (in absentia) at the 60th Annual Meeting of the Radiation Research Society, Las Vegas, NV, September 24, 2014.
5. Invited Speaker, "Radiation-Induced DNA Damage and Repair and Chromosome Aberrations"; "Radiation-Induced Hereditary and Teratogenic Effects and Radiation Protection Standards"; and "History of Modern Time-Dose-Fractionation Relationships in Radiation Oncology". Presented at the 13th Annual University of Maryland Physics and Radiobiology Review Course, Baltimore, MD, April 6-8, 2016. *Highest rated lecturer.*
6. Invited Speaker, "Radiation-Induced DNA Damage and Repair and Chromosome Aberrations"; "Radiation-Induced Hereditary and Teratogenic Effects and Radiation Protection Standards"; and "History of Modern Time-Dose-Fractionation Relationships in Radiation Oncology". Presented at the 14th Annual University of Maryland Physics and Radiobiology Review Course, Baltimore, MD, March 30 – April 1, 2017. *Highest rated lecturer.*
7. Invited Graduation Speaker, "End of One Era, Start of a New". Presented at the professional recognition ceremony for the Radiation Therapy and Medical Dosimetry Class of 2017, UNC Hospitals Schools of Radiation Therapy and Medical Dosimetry and Department of Radiation Oncology, UNC School of Medicine, August 4, 2017, Chapel Hill, NC.
8. Invited Speaker, "Radiation-Induced DNA Damage and Repair and Chromosome Aberrations"; "Radiation-Induced Hereditary and Teratogenic Effects and Radiation Protection Standards"; "History of Modern Time-Dose-Fractionation Relationships"; and "The Tumor Microenvironment". Presented at the 15th Annual University of Maryland Physics and Radiobiology Review Course, Baltimore, MD, April 19-21, 2018. *Highest rated lecturer.*
9. Invited Speaker, "Biology Didactics for Radiation Oncology Residents: The Past, The Present, The Future". Presented at the 64th Annual Meeting of the Radiation Research Society, Chicago, IL, September 25, 2018.
10. Invited Speaker, "Radiation-Induced DNA Damage and Repair and Chromosome Aberrations"; "Radiation-Induced Hereditary and Teratogenic Effects and Radiation Protection Standards"; "History of Modern Time-Dose-Fractionation Relationships"; and "The Tumor Microenvironment". Presented at the 16th Annual University of Maryland Karl L. Predd Physics and Radiobiology Review Course, Baltimore, MD, April 11-13, 2019. *Highest rated lecturer.*
11. Digital Poster Discussion Presentation, "Viewpoints on Biology Didactic Courses: Current Residents, Future Residents and Residency Program Directors". Presented at the 61st Annual Meeting of the American Society for Radiation Oncology, Chicago, IL, September 17, 2019.

October 23, 1987, Worcester, MA. charlotte flair. April 5, 1986, Charlotte, NC. lana. March 24, 1985, Gainesville, FL. naomi. November 30, 1987, Sanford, FL. tyson t-bone. June, 9, 1981, Worcester, Worcestershire, England. wolfgang. December 3, 1986, Scotland, United Kingdom. zack gibson. August 8, 1990, Liverpool, United Kingdom. charlie morgan. April 19, 1992, Cambridge, United Kingdom.