

CURRICULUM VITAE

Calvin Lee Keeler, Jr., Ph.D.

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CURRENT POSITIONS

Professor, Department of Animal and Food Sciences, University of Delaware

1999 - present

Professor, Department of Entomology and Applied Ecology, University of Delaware

1998 – present (joint appointment)

Professor, Department of Biological Sciences, University of Delaware

1998 – present (joint appointment)

Affiliated Faculty, Delaware Biotechnology Institute, 1999 – present

Affiliated Faculty, University of Delaware Avian Biosciences Center, 2006 – present

Affiliated Faculty, University of Delaware Center for Bioinformatics & Computational Biology,

2010 - present

EDUCATION

E.I. du Pont de Nemours & Co., Wilmington, DE

Visiting Scientist (Post-doctoral Research Associate) 1985-1987

Advisor: Dr. Lynn Enquist

University of Maryland Baltimore County (UMBC), Catonsville, MD

Ph.D., Biology, 1987

Research advisor: Dr. Yoshinori Takeda

Medical College of Virginia/Virginia Commonwealth University (MCV/VCU)

Richmond, VA, M.S., Microbiology, 1979

Research advisor: Dr. Frank Macrina

Tufts University, Medford, MA

B.S., Biology (cum laude), 1976

MEMBERSHIPS

Member, American Society for Microbiology (ASM), 1978-present

Member, American Society for Virology (ASV), 1988-present

Member, Poultry Science Association (PSA), 1988-present

Associate member, American Association of Avian Pathologists (AAAP), 1991-present

Member, American Association for the Advancement of Science (AAAS), 1992-present

EXTERNAL SERVICE

Avian Diseases, Editorial Board, 1996 – 2005, Advisory Board 2009-

Poultry Science, Associate Editor, Immunology Health and Disease, 2005-2008

Ad hoc reviewer - Journal of Virology; Infection and Immunity; Vaccine, Environmental Mutagenesis, Molecular and Cellular Probes, Proceedings of the National Academy of Sciences USA, Avian Pathology, Comparative and Developmental Immunology, Environmental Science & Technology, Journal of General Virology, Cytogenetic and Genome Research, Cell Biology and Toxicology

USDA NRICGP Program on the Molecular and Cellular Basis of Animal Disease. Panel member, 2002-2003; Ad hoc reviewer, 1991-1998

USDA CSREES Small Business Innovation Research Program. Ad hoc reviewer - 2008

Fonds zur Forderung der wissenschaftlichen Forschung (Austrian Science Fund) Ad hoc reviewer- 1998, 2000

BARD, United States-Israel Binational Agricultural Research and Development Fund. Ad hoc reviewer - 1992-93, 2008

Canadian Institute of Health Research. Ad hoc reviewer - 2002

National Sciences and Engineering Research Council of Canada (NSERC) Ad hoc reviewer 2002, 2005

University of Maryland College of Agriculture Grants Program. Panel member 1998-1999.

The Thomas F. and Kate Miller Jeffress Memorial Trust. Ad hoc reviewer - 2009

External Promotion and Tenure Reviewer – University of Tennessee at Memphis, University of Georgia, Mississippi State University

FASS (Federation of Animal Science Societies) Committee on Biotechnology. Member – 2001 – present

Planning Committee for FASS Avian Influenza Professional Series Seminar - “Avian Influenza: The Emerging Global Impact” April 29, 2005, Atlanta, GA

Allerton III: Beyond Livestock Genomics: A Roadmap for Harvesting the Promise Development of a plan for the utilization of genomic information to promote animal health and production with recommendations to USDA. Champaign, IL, July 9-10, 2002

AAAP Biotechnology Interest Group – member 1995 – present, Chairperson 2004-2007

Coordinator for AAAP 50th Anniversary Symposium – “Biotechnology – Impact on Avian Health” July 15, 2007, Washington, D.C.

AAAP Awards Committee – member 2007 – present, Assistant Chairperson 2007 - present

Consultant, Molecular Toxicology, Inc., Annapolis, MD, 1986-1987

UNIVERSITY SERVICE

Member, Middle States Review Steering Committee, 2009-present

Member, Institutional Select Agent Review Committee, 2008-present

Member, University Board of Senior Thesis Readers, 1999-2009

Chair, University of Delaware Office of Laboratory Animal Medicine Safety Committee, 1996-2004

Chair, University of Delaware Assistant Director of Laboratory Animal Care Search Committee, 1999-2000
Chair, University of Delaware Director of Laboratory Animal Care Search Committee 1997-1998
University of Delaware Scholarship Panel, 1998-1999
Member, University of Delaware Faculty Senate, 1994-1998
Liaison for the Genetics Computer Group Sequence Analysis Software Package at the University of Delaware, 1991-1998
Faculty Senate Committee on Research, 1993-1994
Faculty Senate Committee on Student and Faculty Honors, 1993
Graphics Services Supervisor Search Committee, 1991

COLLEGE SERVICE

Chair, College of Agriculture and Natural Resources Promotion and Tenure Committee, 2007-2008; member 1989, 1993-1994, 2002-2003, 2006-2007
College of Agriculture and Natural Resources (CANR) Research Partnership. Review Panel member, 2001-2003, 2005-2006, 2008
Ag Scholars reader/interviewer, 1999 - 2005
Townsend Hall Renovations Committee, 1997-2000
Agricultural Communications advisory committee. 1997-1998
Department of Entomology and Wildlife Conservation Wildlife Ecologist Search Committee, 2002-2003
Department of Plant and Soil Sciences Plant Molecular Biology Search Committee (2), 1997
College of Agricultural Science Communications Specialist Search Committee, 1997
College of Agriculture and Natural Resources Courses and Curriculum Committee, 2002-2005
Department of Entomology Promotion and Tenure Committee, 1989
Honors Day Committee, 1988

DEPARTMENT SERVICE

Assistant Department Chairperson 2000-2005
Chair, Courses and Curriculum Committee, 2002-2005; member 1994-2005, 2007-present
Chair, Department Promotion and Tenure Committee, 2008-2009; member 1993, 1995, 2001-2002, 2004-2006, 2009-2010
Graduate Studies Committee, 1989-1995
Department Retreat Committee, 1989

Equine Science Search Committee, 2008-2009
Chair, Avian Microbiologist Search Committee 2006-2007
Chair, Avian Virologist Search Committee 2006
Chair, Food Virologist Search Committee 2002-2003
Animal and Food Science Laboratory Coordinator Search Committee, 2002
Chair, Food Biochemist/Molecular Biologist Search Committee, 1996-97
Molecular/Cellular Immunologist Search Committee, 1992
Molecular Endocrinologist Search Committee, 1989

REFEREED PUBLICATIONS (31)

1. Kim, C.-H., H.S. Lillehoj, Y.-H. Hong, **C.L. Keeler, Jr.** and E.P. Lillehoj. (2010) Comparison of global transcriptional responses to primary and secondary *Eimeris acervulina* infections in chickens. *Developmental and Comparative Immunology* **34**:344-351.
2. Kim, D.K., Kim, C.H., Lamont, S.J., **Keeler, C.L.** and H.S. Lillehoj. (2009) Gene expression profiles of two B-complex disparate, genetically inbred Fayoumi chicken lines that differ in susceptibility to *Eimeria maxima*. *Poultry Science* **88**:1565-1579.
3. Kim, C.H., H.S. Lillehoj, T.W. Bliss, **C.L. Keeler**, Y.H. Hong, D.W. Park, M. Yamage, W. Min and E.P. Lillehoj. (2008) Construction and application of an avian intestinal intraepithelial lymphocyte cDNA microarray (AVIELA) for gene expression profiling during *Eimeria maxima* infection. *Veterinary Immunology and Immunopathology*. **124**:341-354.
4. Lavric, M., M.N. Maughan, T.W. Bliss, J.E. Dohms, D. Bencina, **C.L. Keeler, Jr.** and M. Narat. (2008) Gene expression modulation of chicken macrophages infected by *Mycoplasma synoviae* or *Escherichia coli*. *Veterinary Microbiology* **126**:111-121.
5. Lillehoj, H.S., **C.L. Keeler, Jr.** and C.-H. Kim. (2007) Immunogenomics approach to study host innate immunity against intestinal parasites. *Poultry Science*. **86**:1491-1500.
6. **Keeler, C.L., Jr.**, T.W. Bliss, M. Lavric and M.N. Maughan. (2007) A functional genomics approach to the study of avian innate immunity. *Cytogenetic and Genome Research*. **117**:139-145.
7. Dalloul, R.A., T.W. Bliss, Y.-H. Hung, I. Ben-Chouikha, D.W. Park, **C.L. Keeler, Jr.** and H.S. Lillehoj. (2007) Unique responses of the avian macrophage to different species of *Eimeria*. *Molecular Immunology* **44**:558-566.
8. Thureen, D.R. and **C. L. Keeler, Jr.** (2006) Psittacid herpesvirus 1 and infectious laryngotracheitis virus: Comparative analysis of two avian alphaherpesviruses. *Journal of Virology*. **80**:7863-7872.
9. Bliss, T.W., J.E. Dohms, M.G. Emara and **C.L. Keeler, Jr.** (2005) Gene expression profiling of avian macrophage activation. *Veterinary Immunology and Immunopathology* **105**:289-299.
10. Whetzel, P.L., L.L. Hnatow, **C.L. Keeler, Jr.** and J.E. Dohms. (2003) Transposon mutagenesis of *Mycoplasma gallisepticum*. *Plasmid* **49**:34-43 .
11. Underwood, R.M., R.J. Crockett, R.R. Roth, **C.L. Keeler, Jr.** and M.S. Parcels. (2002) A comparison of flow cytometry and the polymerase chain reaction (PCR) as sexing techniques. *Journal of Field Ornithology* **73**:239-245.

12. Nix, W.A., D.S. Troeber, B.F. Kingham, **C.L. Keeler, Jr.** and J. Gelb, Jr. (2000) Emergence of subtype strains of the Arkansas serotype of infectious bronchitis virus in Delmarva broiler chickens. *Avian Diseases* **44**:568-581. *Winner of the 2001 P.P. Levine Award for best paper published in Avian Diseases.*
13. Keeler, S.J., C.M. Boettger, J.G. Haynes, K.A. Kuches, M.M. Johnson, **C.L. Keeler, Jr.**, D. Thureen and S.L. Kitto. (2000) Characterization and expression of the HSP100/ClpB protein genes of *Phaseolus lunatus*. *Journal of Plant Physiology* **123**:1121-1132.
14. Kingham, B.F., **C.L. Keeler, Jr.**, W.A. Nix and J. Gelb, Jr. (2000) Identification of avian infectious bronchitis virus by direct automated cycle sequencing of the S-1 gene. *Avian Diseases* **44**:325-335.
15. Kingsley, D.H. and **C.L. Keeler, Jr.** (1999) Infectious laryngotracheitis virus, an alpha herpesvirus that does not interact with cell surface heparan sulfate. *Virology* **256**:213-219.
16. Hnатов, L.L., **C.L. Keeler, Jr.**, L. Tessmer, K. Czymmek and J.E. Dohms. (1998) Characterization of MGC2, a *Mycoplasma gallisepticum* gene cytoadhesin with homology to *Mycoplasma pneumoniae* P30 and *Mycoplasma genitalium* P32. *Infection and Immunity* **66**:3436-3442.
17. **Keeler, C.L., Jr.**, K.L. Reed, W.A. Nix and J. Gelb, Jr. (1998) Serotype identification of avian infectious bronchitis virus (IBV) by RT-PCR of the peplomer (S-1) gene. *Avian Diseases* **42**:275-284.
18. Poulsen, D.J., D.R. Thureen and **C.L. Keeler, Jr.** (1998) Comparison of disease susceptibility and resistance in three inbred lines of chickens experimentally infected with infectious laryngotracheitis virus. *Poultry Science* **77**:17-21.
19. Poulsen, D.J. and **C.L. Keeler, Jr.** (1997) Characterization of the assembly and processing of infectious laryngotracheitis virus glycoprotein B. *Journal of General Virology* **78**:2945-2951.
20. Gelb, J., Jr., **C.L. Keeler, Jr.**, W.A. Nix, J.K. Rosenberger and S.S. Cloud. (1997) Antigenic and S-1 genomic characterization of the Delaware variant serotype of infectious bronchitis virus. *Avian Diseases* **41**:661-669.
21. **Keeler, C.L., Jr.**, L.L. Hnатов, P.L. Whetzel and J.E. Dohms. (1996) Cloning and characterization of a putative cytoadhesin gene (mgc1) from *Mycoplasma gallisepticum*. *Infection and Immunity* **64**:1541-1547.
22. Kingsley, D.K., J.W. Hazel and **C.L. Keeler, Jr.** (1994) Identification and characterization of the infectious laryngotracheitis virus glycoprotein C gene. *Virology* **203**:336-343.

23. **Keeler, C.L., Jr.**, J.W. Hazel, J.E. Hastings and J.K. Rosenberger. (1993) Restriction endonuclease analysis of Delmarva field isolates of infectious laryngotracheitis virus. *Avian Diseases* **37**:418-426.
24. Dohms, J.E., L.L. Hnatow, P. Whetzel, R. Morgan and **C.L. Keeler, Jr.** (1993) Identification of the putative cytoadhesin gene of *Mycoplasma gallisepticum* and its use as a diagnostic DNA probe. *Avian Diseases* **37**:380-388.
25. **Keeler, C.L., Jr.**, D.H. Kingsley and C.R.A. Burton. (1991) Identification and cloning of the thymidine kinase gene of infectious laryngotracheitis virus. *Avian Diseases* **35**:920-929.
26. Poulsen, D.J., C.R.A. Burton, J.J. O'Brian, S.J. Rabin and **C.L. Keeler, Jr.** (1991) Identification of the infectious laryngotracheitis virus glycoprotein gB gene by the polymerase chain reaction. *Virus Genes* **5**:335-347.
27. Ryan, J.P., M.E. Whealy, A.K. Robbins, **C.L. Keeler, Jr.** and L. W. Enquist. (1989) Genetic analysis of a herpesvirus glycoprotein signal sequence In: *Cell Biology of Virus Entry, Replication and Pathogenesis* R. Compans, A. Helenius and M. Oldstone (eds.) Alan R. Liss, Inc., New York, N.Y. pp. 299-308.
28. Enquist, L.W., **C.L. Keeler, Jr.**, A.K. Robbins, J.P. Ryan and M.E. Whealy. (1988) An amino-terminal deletion mutation of PRV glycoprotein gIII affects RNA accumulation and protein localization. *Journal of Virology* **62**:3565-3573.
29. Parris, W., A Davidson, **C.L. Keeler, Jr.**, and M. Gold. (1988) The Nu1 subunit of bacteriophage terminase. *Journal of Biological Chemistry* **263**:8413-8419.
30. **Keeler, C.L., Jr.**, M.E. Whealy and L.W. Enquist (1986) Construction of an infectious pseudorabies virus recombinant expressing a glycoprotein gIII- β -galactosidase fusion protein. *Gene* **50**:215-224.
31. Macrina, F.L., **C.L. Keeler**, K.R. Jones and P.H. Wood (1980) Molecular characterization of unique deletion mutants of the streptococcal plasmid pAM α 1. *Plasmid* **4**:8-16.
32. Rothstein, D., **C.L. Keeler** and A.L. Sonenshein (1976) RNA polymerase mutants temperature-sensitive for sporulation. In: *RNA Polymerase* R. Losick (ed.) Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y. pp. 601-615.

PATENTS

1. **Keeler, C.L.** and D.J. Poulsen. (1995) Gene encoding glycoprotein B of infectious laryngotracheitis virus. U.S. Patent Number 5,443,831. Issued Aug.22, 1995

2. **Keeler, C.L.** and J.E. Dohms. (1995) Gene encoding cytoadhesin protein of *Mycoplasma gallisepticum* and its use. U.S. Patent Number 5,378,820. Issued Jan. 3, 1995.
3. **Keeler, C.L., Jr.** (1994) Recombinant infectious laryngotracheitis virus. U.S. Patent Number: 5,279,965. Issued Jan. 18, 1994

BOOK CHAPTERS

1. **Keeler, C.L., Jr.** (2002) Genus ILTV-like viruses (*Herpesviridae*). In: The Springer Index of Viruses. Springer-Verlag GmbH & Co., Heidelberg, Germany
2. **Keeler, C.L., Jr.** (1992) Basic science of biotechnology. In: Biotechnology: Science and Socioeconomic Issues. L.G. Sterling, C.K. Halbrecht and S.L. Kitto (eds.) Kendall/Hunt Publishing Co., Dubuque, IA. pp. 9-15.

INVITED PROCEEDINGS

1. **Keeler, C.L., Jr.** (2007) Microarrays and future diagnostic applications. AAAP 50th Anniversary Symposium 2007 – Biotechnology – Impact on Avian Health, Washington, D.C.
2. **Keeler, C.L., Jr.**, T.W. Bliss and M.N. Maughan. (2006) Microarray technology and its use in studying avian innate immunity. 4th Congress of Slovenian Genetic Society, Ljubljana, SLOVENIA. p.42.
3. **Keeler, C.L., Jr.**, M.N. Maughan and T.W. Bliss. (2006) The use of microarrays in diagnostic microbiology – Proceedings of the 55th Western Poultry Disease Conference, Sacramento, CA. pp. 1-3.
4. **Keeler, C.L., Jr.** (2002) Infectious laryngotracheitis vaccine development and use. AAAP Symposium 2002 – Poultry Vaccines and Vaccination Practices, Nashville, TN
5. **Keeler, C.L., Jr.** (2001) New approaches to control LT. Proc. 36th National Meeting on Poultry Health and Processing. Ocean City, MD.
31. **Keeler, C.L., Jr.** (2001) New approaches in ILTV vaccine development. AAAP Symposium 2001 – Respiratory Diseases of Poultry, Boston, MA.
7. Gelb, J., Jr., **C.L. Keeler, Jr.**, B.S. Ladman and B.F. Kingham. (2001) S1 sequence analysis; Tools for understanding IBV outbreaks. AAAP Symposium 2001 – Respiratory Diseases of Poultry, Boston, MA.
8. **Keeler, C.L., Jr.** (2000) DNA vaccines. XXI World's Poultry Congress, Montreal, CANADA

9. **Keeler, C.L., Jr.** (2000) Infectious laryngotracheitis virus: Can we identify the bad guys? AAAP Symposium 2000 – Molecular identification and epidemiology of avian pathogens, Salt Lake City, Utah.
10. **Keeler, C.L., Jr.** (1997) DNA vaccines: A new tool for improving animal health. Cambridge Healthtech Institute's program on the Impact of Molecular Biology on Animal Health and Production Research. Baltimore, MD.
11. **Keeler, C.L., Jr.** (1996) Distinguishing ILT vaccine and field viruses - a new approach. Proc. 31st National Meeting on Poultry Health and Processing. Ocean City, MD. pp. 37-41.
12. **Keeler, C.L., Jr.** (1993) Poultry viral vaccine vectors. Memorias XVI Seminario Avicola Internacional. Santafe de Bogota, Columbia, S.A. pp. 6-16.
13. **Keeler, C.L., Jr.** (1993) Diagnostic applications of PCR. Memorias XVI Seminario Avicola Internacional. Santafe de Bogota, Columbia, S.A. pp. 17-27.
14. **Keeler, C.L., Jr.** (1992) Poultry viral vaccine vectors: avipox. Proc. 27th National Meeting on Poultry Health and Processing. Ocean City, MD. pp. 51-54.

INVITED PRESENTATIONS

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|--------------------|---|
| July 15, 2007 | “Microarrays and future diagnostic applications” AAAP 50 th Anniversary Symposium 2007 – Biotechnology – Impact on Avian Health, Washington, D.C. |
| June 19, 2007 | “Influenza diagnostics for poultry and human use” Lawrence Livermore National Laboratory, Livermore, CA |
| September 29, 2006 | “Microarray technology and its use in studying avian innate immunity” 4 th Congress of Slovenian Genetic Society, Ljubljana, Slovenia |
| March 6, 2006 | “The use of microarrays in diagnostic microbiology” 55 th Western Poultry Disease Conference, Sacramento, CA |
| October 18, 2005 | “The response of the avian heterophil transcriptome to Salmonella” The Third Biannual FFSRU-ARS Food and Feed Safety Training/Workshop, College Station, TX |
| July 26, 2004 | “Gene expression patterns in differentially stimulated avian macrophages” Workshop on Immune Response Genes. 7 th International Veterinary Immunology Symposium, Quebec City, Canada |
| November 29, 1999 | “Using functional genomics to study avian herpesviruses” Department of Avian Medicine, University of Georgia |

November 18, 1999 "Molecular biology of avian herpesviruses", Department of Pathobiology, University of Connecticut

September 29, 1998 "Glycoproteins of infectious laryngotracheitis virus", Pfizer, Inc., Groton, CT

May 22, 1998 "Infectious laryngotracheitis virus: Glycoproteins and genetic vaccines", Department of Biology, University of Delaware

April 7, 1998 "Infectious laryngotracheitis virus: Glycoproteins and genetic vaccines", Megan Health, St. Louis, MO.

March 11, 1997 "DNA vaccines: A new tool for improving animal health", Impact of Molecular Biology on Animal Health and Production Research, Cambridge Health Institute, Baltimore, MD.

May 7, 1996 "Practical applications of molecular biology for the poultry industry", Department of Poultry Science, University of Arkansas, Fayetteville, AR

May 6, 1996 "Glycoproteins of ILTV - Immunology and biology", Department of Poultry Science, University of Arkansas, Fayetteville, AR.

July 8, 1994 "rDNA ILT vaccines", Solvay Animal Health, Mendota, MN.

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April 21, 1993 "Poultry viral vaccine vectors", XVI Seminario Avicola Internacional, Santafe de Bogota, Columbia, S.A.

April 21, 1993 "Diagnostic applications of PCR", XVI Seminario Avicola Internacional, Santafe de Bogota, Columbia, S.A.

October 15, 1992 "Poultry viral vaccine vectors: avipox", 27th National Meeting on Poultry Health and Processing, Ocean City, MD.

January 15, 1992 "Career options: voices of experience", Du Pont-Merck Post-Doctoral Fellow Career Day, Du Pont Merck Pharmaceutical Co., Wilmington, DE.

April 3, 1991 "Molecular biology of the other poultry herpesvirus, ILTV", USDA Regional Poultry Research Laboratory, East Lansing, MI.

March 6, 1991 "Molecular biology of a poultry herpes virus", School of Life and Health Sciences, University of Delaware, Newark, DE.

October 29, 1990 "On the way to improved poultry vaccines", Delaware Research Partnership Luncheon, University of Delaware, Newark, DE.

- May 15, 1989 "Making chickens less foul: Poultry vaccines through genetic engineering", Biotechnology Luncheon Seminar Series, University of Delaware, Newark, DE.
- November 30, 1987 "Studies on herpesvirus glycoprotein localization", Dept. of Chemistry and Biochemistry, University of Delaware, Newark, DE
- April 9, 1987 "Using gene fusions to study the gIII glycoprotein gene of pseudorabies virus", Dept. of Animal Science and Agricultural Biochemistry, University of Delaware, Newark, DE.
- March 30, 1987 "Characterization of a pseudorabies virus mutant expressing a glycoprotein gIII- β -galactosidase fusion protein", E.I. du Pont de Nemours, Wilmington, DE.
- October 10, 1986 "Cloning and overexpression of the terminase proteins from bacteriophage lambda" Bethesda Research Laboratories, Gaithersburg, MD.
- June 16, 1986 "Overproducing the terminase proteins of lambda", E.I. du Pont de Nemours, Wilmington, DE.

ARTICLES

1. Infectious bronchitis virus still a problem for poultry farms. Poultry Times, Oct. 1, 2001.

ABSTRACTS (21 in last 5 years - 75 total)

1. **C.L. Keeler, Jr.**, H. Zhou, T.W. Bliss, I.H.T. Chung and S.J. Lamont. (2009) Transcriptional analysis of the avian innate immune response to *Salmonella enteritidis*. 146th Annual Convention of the AVMA, Seattle, WA.
2. I.H.T. Chung, S.J. Lamont, H. Zhou, T.W. Bliss and **C.L. Keeler, Jr.** (2009) Transcriptional analysis of the innate immune response in two lines of F8 advanced intercross chickens upon exposure to *Salmonella enteritidis* infection. ASM, Philadelphia, PA.
3. L. Dougherty, M.N. Maughan and **C.L. Keeler, Jr.** (2009) Transcriptional responses of the Pekin Duck (*Anas domestica*) to infection with avian influenza. 7th International Symposium on Avian Influenza, Athens, GA. p. 44.
4. D. Dusanic, M. Lavric, D. Bencina, **C.L. Keeler** and M. Narat. (2008) Interplay between *Mycoplasma synoviae*, immune cells and chondrocytes in the development of infectious synovitis in chickens.

5. **C.L. Keeler, Jr.**, M.N. Maughan, L. Dougherty, J. Gelb, Jr. (2008) Species specific responses to infection with avian influenza. 145th Annual Convention of the AVMA, New Orleans LA.
6. I.H.T. Chung, **C.L. Keeler, Jr.**, D.R. Kapczynski and M.N. Maughan (2008) Transcriptional analysis of the innate immune response in chickens upon exposure to highly pathogenic H5N1.
7. C.-H. Kim, H.S. Lillehoj, Y.-H. Hong and **C.L. Keeler, Jr.** (2007) Comparison of transcriptional responses from avian gut tissues after *E. acervulina* and *E. maxima* infections using cDNA microarray technology. International Symposium on Animal Genomics for Animal Health, Paris, France.
8. S. Zhang, H.S. Lillehoj, C.-H. Kim, **C.L. Keeler, Jr.**, U. Babu and M. Zhang. (2007) Transcriptional response of chicken macrophages to *Salmonella enterica* serovar Enteritidis infection. International Symposium on Animal Genomics for Animal Health, Paris, France.
9. C.-H. Kim, R.A. Dalloul, Y.-H. Hong, D.-W. Park, **C.L. Keeler** and H.S. Lillehoj. (2007) Kinetic analysis of local gene expression of duodenum intraepithelial lymphocytes following primary and secondary *E. acervulina* infections. 144th Annual Convention of the AVMA, Washington, D.C.
3. H.S. Lillehoj, R.A. Dalloul, T.W. Bliss, Y.-H. Hong, D.-W. Park and **C.L. Keeler, Jr.** (2006) Macrophage gene expression analysis of innate immune response to *Eimeria*. 88th Annual Meeting of the Conference of Research Workers in Animal Disease. Chicago, IL.
4. **C.L. Keeler, Jr.**, T.W. Bliss and M.N. Maughan. (2006) Utility of an avian innate immunity microarray (AIIM). 9th International Avian Immunology Research Group Meeting, Paris, France. p. 21
5. M. Lavrič, T.W. Bliss, J.E. Dohms, D. Benčina, **C.L. Keeler Jr.** and M. Narat (2006) Modulation of gene expression in chicken macrophages by exposure to *Mycoplasma synoviae*, *Escherichia coli*, and their derivatives. 9th International Avian Immunology Research Group Meeting, Paris, France. p. 66
6. Dalloul, R.A., T.W. Bliss, Y.-H. Hong, D.W. Park, **C.L. Keeler, Jr.** and H.S. Lillehoj (2006) Investigation of innate immune response to three different *Eimeria* species using chicken cDNA macrophage microarray. 9th International Avian Immunology Research Group Meeting, Paris, France. p. 99.
7. M. Lavrič, T.W. Bliss, M.N. Maughan, J.E. Dohms, D. Benčina, B. Kaspers, **C.L. Keeler Jr.** and M. Narat (2006) Molecular characterization of chicken immunocompetent cell response to *Mycoplasma synoviae* haemagglutinins. 4th Congress of Slovenian Genetic Society, Ljubljana, Slovenia. p.66.

8. Maughan, M.N., T.W. Bliss, D.L. Suarez, and **C.L. Keeler, Jr.**, (2006) Detection, subtyping, and characterization of avian influenza via cDNA microarray. 143rd Annual Convention of the AVMA, Honolulu, HI. **Winner of the Richard Rimmler Paper Award.**
9. **C.L. Keeler, Jr.**, H. Lillehoj, M. Kogut, S. Lamont, and T. Bliss. (2006) Development and use of an avian innate immunity microarray (AIIM). 143rd Annual Convention of the AVMA, Honolulu, HI.
10. Dalloul, R.A., H.S. Lillehoj, T.W. Bliss, Y.H. Hong, D.W. Park and **C.L. Keeler, Jr.** (2006) Investigating the avian macrophage response to different *Eimeria* species using cDNA microarray. 143rd Annual Convention of the AVMA, Honolulu, HI.
11. Lavrič M., T.W. Bliss, J.E. Dohms, D. Benčina, M. Narat and **C.L. Keeler Jr.** (2006) Modulation of gene expression in chicken macrophages by *Mycoplasma synoviae*. 143rd Annual Convention of the AVMA, Honolulu, HI.
12. Lillehoj, H.S., R. Dalloul, T.W. Bliss, Y.H. Hong and **C.L. Keeler**. (2005) Identification of macrophage genes expressed following infection with sporozoites of three different *Eimeria* species and investigation of innate immunity against coccidiosis. CSREES PD Workshop, St. Louis, MO
13. Lillehoj, H.J., R.A. Dalloul, Y.H. Houg, T.W. Bliss, **C.L. Keeler** and J.Y. Han. (2005) Application of functional genomics, immunology and molecular biology tools to explore mucosal immune responses against *Eimeria*. 87th Annual Meeting of the Conference of Research Workers in Animal Disease. St. Louis, MO.
14. Dalloul, R.A., H.S. Lillehoj, T.W. Bliss, Y.-H. Hong and **C.L. Keeler**. (2005) Common and unique gene expression of avian macrophages in response to three major *Eimeria* species. IX International Coccidiosis Conference, Iguacu Falls, Brazil.
15. **Keeler, C.L., Jr.**, W.M. Schnitzlein, A.E. Shaffer and D.N. Tripathy (2005) Characterization of a glycoprotein C mutant of infectious laryngotracheitis. 142th Annual Convention of the AVMA, Minneapolis, MN. p.52
16. Maughan, M.N., T.W. Bliss, D.L. Suarez and **C.L. Keeler, Jr.** (2005) Microarray technology for detection of avian influenza. 142th Annual Convention of the AVMA, Minneapolis, MN. p.63. **Winner of the A.S. "Rosy" Rosenwald Poster Award.**
17. Bliss, T.W., J.E. Dohms, M.G. Emara and **C.L. Keeler, Jr.** (2005) Avian macrophage transcriptome responses to bacterial stimuli. 142th Annual Convention of the AVMA, Minneapolis, MN. p.68
18. **C.L. Keeler, Jr.**, M.G. Emara, J.E. Dohms and T.W. Bliss. (2004) Characterizing gene expression changes during the phagocytosis of *Escherichia coli* using an avian macrophage microarray. 8th International Avian Immunology Research Group Meeting, Munich, Germany. p.42.

19. T.W. Bliss, M.G. Emara, J.E. Dohms, H.S. Lillehoj and **C.L. Keeler**. (2004) Gene expression patterns in differentially stimulated avian macrophages. 7th International Veterinary Immunology Symposium, Quebec City, Canada. p.157
20. **C.L. Keeler, Jr.**, W.M. Schnitzlein, A.E. Shaffer and D.N. Tripathy (2003) In vivo characterization of a glycoprotein C mutant of infectious laryngotracheitis virus. 140th Annual Convention of the AVMA, Denver, CO.
21. Bliss, T.W., M.G. Emara and **C.L. Keeler, Jr.** (2001) Characterization of a possible avian macrophage chemoattractant from an avian macrophage EST library. 138th Annual Convention of the AVMA, Boston, MA. p. 54.
22. Bliss, T., S. Czerwinski, A. Rafalski and **C.L. Keeler, Jr.** (2000) Construction of a cDNA library and DNA microarray from LPS induced HD11 avian macrophage cells. 72nd Northeastern Conference on Avian Diseases. Newark, DE. p.25.
23. **Keeler, C.L., Jr.** and D.R. Thureen. (1999) Characterization of the Pacheco's disease virus genome. 136th Annual Convention of the AVMA. New Orleans, LA.
24. Crockett, R., R. Roth, R. Underwood, **C. Keeler**, and M. Parcels. (1999). Accuracy of flow cytometry and PCR techniques for sexing Wood Thrushes.
25. Kingham, B.F., J. Gelb, Jr., **C.L. Keeler** and W.A. Nix. (1998). Direct automated sequencing of the avian infectious bronchitis virus S-1 gene amplified by RT-PCR: Use for serotype identification. 70th Northeastern Conference on Avian Diseases. Guelph, Ontario, CANADA.
26. Keeler, S.J., C.M. Boettger, J.G. Haynes, K.A. Kuches, M.M. Johnson, **C.L. Keeler**, D. Thureen and S.L. Kitto. (1998). Characterization and expression of the HSP100/ClpB protein genes of *Phaseolus lunatus*. Cold Spring Harbor Laboratory. Cold Spring Harbor, NY. p. 137.
27. Gelb, J., Jr., W.A. Nix, **C.L. Keeler, Jr.**, B.F. Kingham, D.S. Troeber and C.J. Willer. (1997). Emerging IBV isolates. Proc. 32nd National Meeting on Poultry Health & Processing. Ocean City, MD. p. 36.
28. **Keeler, C.L., Jr.** (1997). Glycoproteins of infectious laryngotracheitis virus. 69th Northeastern Conference on Avian Diseases. Ithaca, NY. p.3.
29. Cui, J., D.R. Thureen and **C.L. Keeler, Jr.** (1997). T cell responses in chickens immunized with infectious laryngotracheitis virus glycoprotein B. 69th Northeastern Conference on Avian Diseases. Ithaca, NY. p.5.

30. Gelb, J., Jr., **C.L. Keeler**, W.A. Nix and B.F. Kingham. (1996) Evaluating and developing effective IBV vaccination programs. Proc. 31st National Meeting on Poultry Health and Processing. Ocean City, MD. pp. 21-25.
31. **Keeler, C.L., Jr.**, D.R. Thureen and J. Cui. (1996) Characterization of the avian immune response to ILTV glycoprotein B. Poultry Science 75: (Supplement 1) p.9.
32. Thureen, D.R. and **C.L. Keeler, Jr.** (1996) Restriction endonuclease analysis of field isolates of infectious laryngotracheitis virus. 68th Northeastern Conference of Avian Diseases. University Park, PA. p.12.
33. Hnatow, L.H., **C.L. Keeler, Jr.**, L.L. Tessmer and J.E. Dohms. (1996) Characterization of a second Mycoplasma gallisepticum cytoadhesin. 68th Northeastern Conference of Avian Diseases. University Park, PA. p.16.
34. Kudish, P., **C. Keeler**, C. Pope, W.A. Nix, S. Cloud and J. Gelb, Jr. (1996) Mutations in the S1 attachment gene of avian infectious bronchitis virus are associated with attenuation. 68th Northeastern Conference of Avian Diseases. University Park, PA. p.21.
35. Gelb, J., Jr., W.A. Nix, **C.L. Keeler**, B.F. Kingham, M.W. Jackwood and S.A. Naqi. (1995) Bronchitis diagnostic technology. Proc. 30th National Meeting on Poultry Health and Processing. Ocean City, MD. pp.41-45.
36. **Keeler, C., Jr.**, D. Poulsen, H. Robinson, J. Santoro and D. Thureen. (1995) Immunization of chickens with gene (DNA) vaccines. 132nd Annual Meeting of the AVMA. Pittsburgh, PA. p.143.
37. Dohms, J.E., **C.L. Keeler, Jr.**, L.L. Hnatow and B.F. Kingham. (1995) Mycoplasma gallisepticum diagnosis using nucleic acid sequence data from putative cytoadhesin genes. 132nd Annual Meeting of the AVMA. Pittsburgh, PA. p.130.
38. Dohms, J.E., **C.L. Keeler, Jr.**, L.L. Hnatow, P.L. Whetzel, L.L. Tessmer and B.F. Kingham. (1995) Studies of the molecular pathogenesis of Mycoplasma gallisepticum. 67th Northeastern Conference on Avian Diseases. Storrs, CT. p.34.
39. Kingsley, D.H. and **C.L. Keeler, Jr.** (1994) Does infectious laryngotracheitis virus attach to avian cells via interactions with heparan sulfate? 19th International Herpesvirus Workshop, Vancouver, B.C. CANADA
40. Gelb, J., Jr., **C.L. Keeler, Jr.**, K.L. Reed and W.A. Nix. (1994) Infectious bronchitis virus genomic S-1 and antigenic analysis link outbreaks in Delmarva peninsula chickens: 1990-1992. 131st Annual Meeting of the AVMA. San Francisco, CA. p.128.
41. Poulsen, D.J., D.R. Thureen and **C.L. Keeler, Jr.** (1994) Influence of the major histocompatibility complex on resistance to infectious laryngotracheitis virus (ILTV) in inbred lines of white leghorn chickens. Poultry Science 73: (Supplement 1) p.108.

42. Poulsen, D.J. and **C.L. Keeler, Jr.** (1994) Characterization of the infectious laryngotracheitis virus (ILTV) glycoprotein B. 66th Northeastern Conference on Avian Diseases. College Park, MD. p.18. *Winner of best student presentation.*
43. Kingsley, D.H., J.W. Hazel and **C.L. Keeler, Jr.** (1993) Identification of a gene encoding a 90kd glycoprotein from infectious laryngotracheitis virus (ILTV). 18th International Herpesvirus Workshop. Pittsburgh, PA. p. C-109.
44. Gelb, J., Jr., **C.L. Keeler, Jr.**, K.L. Reed, W.A. Nix and J.K. Rosenberger. (1993) Epidemiology of an outbreak of infectious bronchitis in Delmarva chickens: 1990-1992. 130th Annual Meeting of the AVMA. Minneapolis, MN. p. 151.
45. Poulsen, D.J., D.R. Thureen and **C.L. Keeler, Jr.** (1993) Susceptibility and immune response to infectious laryngotracheitis virus (ILTV) in inbred lines of white leghorn chickens. 65th Northeastern Conference on Avian Diseases. Newark, DE. p.17.
46. Kingsley, D.H., J.W. Hazel and **C.L. Keeler, Jr.** (1993) Identification of the putative glycoprotein C gene from infectious laryngotracheitis virus. (ILTV) 65th Northeastern Conference on Avian Diseases. Newark, DE. p.18.
47. Gelb, J., Jr., K.L. Reed, **C.L. Keeler** and W.A. Nix. (1993) Polymerase chain reaction identification of IBV using serotype specific primers. 65th Northeastern Conference on Avian Diseases. Newark, DE. pp.23-24.
48. Hnatow, L., **C.L. Keeler, Jr.**, T. Whetzel and J.E. Dohms. (1993) Cloning and complete sequence analysis of the putative MG cytoadhesin gene. 65th Northeastern Conference on Avian Diseases. Newark, DE. pp.31-32.
49. Gelb, J., Jr., **C.L. Keeler**, J.K. Rosenberger, K.L. Reed, W.A. Nix, S.S. Cloud, and M.W. Jackwood. (1992) Bronchitis overview: evolution of the virus. Proc. 27th National Meeting on Poultry Health and Processing. Ocean City, MD. pp.36-37.
50. Gelb, J., K.L. Reed and **C.L. Keeler, Jr.** (1992) Comparison of S-1 gene sequences of the spike peplomer of different infectious bronchitis virus serotypes. 129th Annual Meeting of the AVMA. Boston, MA. p.125.
51. Dohms, J.E., **C.L. Keeler, Jr.**, L.L. Hnatow, R.W. Morgan and P.L. Whetzel (1992) Identification, cloning and sequencing of the putative cytoadhesin gene of Mycoplasma gallisepticum. 129th Annual Meeting of the AVMA. Boston, MA. p.131.
52. **Keeler, C.L., Jr.**, J.K. Rosenberger, S.S. Cloud, D.J. Poulsen, K. Nazerian and A. Yanagida. (1992) A recombinant fowlpox virus protects chickens against challenge by infectious laryngotracheitis virus (ILTV). 129th Annual Meeting of the AVMA. Boston, MA. p.137.

53. Reed, K.L., **C.L. Keeler** and J. Gelb, Jr. (1992) Using the polymerase chain reaction (PCR) to identify and serotype infectious bronchitis virus (IBV). 64th Northeastern Conference on Avian Diseases. University Park, PA. p.6.
54. Hnatow, L., P.L. Whetzel, R.W. Morgan, **C.L. Keeler** and J.E. Dohms. (1992) Studies with a *Mycoplasma gallisepticum* cytoadhesin gene probe. 64th Northeastern Conference on Avian Diseases. University Park, PA. p.3.
55. **Keeler, C.L., Jr.** and D.J. Poulsen. (1992) Characterization of the gB glycoprotein of infectious laryngotracheitis virus. *J. Cellular Biochem.* (Supplement 16C) p.130.
56. Dohms, J.E., **C.L. Keeler**, L.L. Hnatow, R.W. Morgan and P.L. Whetzel. (1991) Cloning of the *Mycoplasma gallisepticum* cytoadhesion gene. 72nd Annual Meeting of the Conference of Research Workers in Animal Disease. Chicago, IL. p.9.
57. **Keeler, C.L., Jr.**, C.R.A. Burton and D.J. Poulsen. (1991) Identification and characterization of the glycoprotein B gene of infectious laryngotracheitis virus. 72nd Annual Meeting of the Conference of Research Workers in Animal Disease. Chicago, IL. p.46.
58. Kingsley, D.H., C.R.A. Burton and **C.L. Keeler, Jr.** (1991) Identification of the thymidine kinase gene from a virulent American field isolate of ILTV. 63rd Northeastern Conference on Avian Diseases. Ithaca, N.Y. p.3.
59. Poulsen, D.J., C.R.A. Burton and **C.L. Keeler, Jr.** (1991) Identification of the infectious laryngotracheitis virus glycoprotein B gene. 63rd Northeastern Conference on Avian Diseases. Ithaca, N.Y. p.2.
60. **Keeler, C.L., Jr.**, J.W. Hazel, J.E. Hastings and J.K. Rosenberger (1991) Restriction endonuclease analysis of Delmarva field isolates of ILTV. 63rd Northeastern Conference on Avian Diseases. Ithaca, N.Y. p.10.
61. **Keeler, C.L., Jr.**, C.R.A. Burton and D.J. Poulsen (1991) Identification of the infectious laryngotracheitis virus gB gene homologue. 16th International Herpesvirus Workshop. Pacific Grove, CA. p.252.
62. **Keeler, C.L., Jr.**, D.H. Kingsley and C.R.A. Burton (1990) Identification of the thymidine kinase gene of infectious laryngotracheitis virus (ILTV). 15th International Herpesvirus Workshop. Washington, D.C. p.167.
63. Hazel, J.W., J.E. Hastings, J.K. Rosenberger and **C.L. Keeler, Jr.** (1989) Differentiation of isolates of infectious laryngotracheitis virus through restriction endonuclease analysis. *Poultry Science* **68**:(Supplement 1) p.64.

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65. Robbins, A.K., M.E. Whealy, J.P. Ryan, **C. Keeler** and L.W. Enquist (1988) Genetic analysis of pseudorabies virus glycoprotein gIII transmembrane mutations. 13th International Herpesvirus Workshop. Irvine, California. p.219.
66. **Keeler, C.L., Jr.**, M.E. Whealy and L.W. Enquist (1986) Construction of a pseudorabies virus mutant carrying a glycoprotein gIII-E. coli lacZ gene fusion. 11th International Herpesvirus Workshop. Leeds, England. p.294.
67. **Keeler, C.L., Jr.** (1986) Overproducing the terminase proteins of lambda. Molecular Genetics of Bacteria and Phage. Cold Spring Harbor, N.Y. p.51.
68. **Keeler, C.L., Jr.** (1986) The cloning and overproduction of the terminase proteins from bacteriophage lambda. Abstracts of the Annual Meeting of the American Society for Microbiology 1986. p.234.
69. Boehmer, S., C. Pfeiffer and **C.L. Keeler** (1985) Characterization of a new temperate phage of *Lactobacillus casei*. SIM News **35**:55.
70. **Keeler, C.L.** and F.L. Macrina (1979) Genetic transformation in *Streptococcus sanguis* strain Challis with pAM α 1 and its derivative pZA1. Plasmid **2**:297.
71. **Keeler, C.L.** and F.L. Macrina (1979) Heterologous transformation in *Streptococcus sanguis* strain Challis with plasmid DNA. J. Dent. Research **58**:336.
72. Macrina, F.L., K.R. Jones and **C.L. Keeler** (1979) Macrolide-lincosamide-streptogramin R plasmid derivatives. Virginia J. Sci. **30**:99.
73. Macrina, F.L., C.L. Scott and **C.L. Keeler** (1978) Plasmid homology and dissemination in oral streptococci. J. Dent. Research **57**:Spc. Issue A p.204.
74. **Keeler, C.L.** and F.L. Macrina (1978) Heterologous genetic transformation in *Streptococcus sanguis*. Virginia J. Sci. **29**:106.

RESEARCH FUNDING – Awards for last 5 years \$871,726

(Total funding - \$2,374,778 from 37 awards)

* Current funding sources

☞ Competitive, peer-reviewed USDA awards

1. Biotechnology Research Development Corporation (BRDC) 7/1/09 – 6/30/10
\$50,000

- 1.* University of Delaware Avian Biosciences Center Grant 1/1/07 – 6/30/07
A functional genomics approach to the study of avian innate immunity
\$17,000

- 2.* ARS Cooperative Research Agreement 9/25/06 – 3/31/09
Biological characterization of low pathogenicity H7 subtype avian influenza viruses and the effects of AI virus infection on gene expression
Co-investigator - Dr. Jack Gelb, Jr.
\$295,000

- ☞ 3.* UMD/USDA AI CAP 2/1/05 – 1/15/09
Identification of avian influenza virus through DNA microarrays
\$125,000

- 4.* ARS Cooperative Research Agreement 1/1/05 – 12/31/07
Identification of host genes which control innate immune responses to intracellular pathogens such as *Eimeria* and *Salmonella* using macrophage and intestinal cDNA microarrays
\$78,695

5. ARS Cooperative Research Agreement 9/30/02 – 9/29/05
“Rapid identification of avian influenza virus through DNA microarrays”
\$50,000

6. U.S. Poultry & Egg Association 7/01/02 – 6/30/04
“Sequencing the *Mycoplasma synoviae* genome”
\$36,031

- ☞ 7. USDA/CSRS National Research Initiative Competitive Grants Program 2002
9/01/02 – 8/31/03
“Microarray analysis equipment for avian genomics research”
\$50,000

- ☞ 8. USDA/CSRS National Research Initiative Competitive Grants Program 2001
12/15/01- 9/30/04
“Understanding macrophage function in the avian system”
Co-investigators – Dr. John Dohms, Dr. Marlene Emara
\$220,000

9. FY2000 Delaware Research Partnership with Maine Biologics 6/1/00-6/30/01
"Molecular biology of ILTV"
\$100,000
10. Morris Animal Foundation 11/1/98 - 12/31/00
"Sequence analysis of the Pacheco's disease virus genome"
\$26,000
- ☞ 11. USDA/CSRS National Research Initiative Competitive Grants Program 1998
9/1/98-5/30/02
"Mechanisms of avian herpesvirus attachment"
\$50,000
12. U. S. Poultry & Egg Association 10/1/97 - 9/30/99
"Use of recombinant Mycoplasma gallisepticum cytoadhesin proteins as vaccines"
Co-investigator - Dr. John Dohms
\$29,877
13. Delmarva Poultry Industry, Inc. 4/1/97-3/31/99
"Characterization of Arkansas IBV variants from Delmarva broilers and development of a second generation PCR diagnostic test for IBV"
Co-investigators - Dr. Jack Gelb, Jr., Mr. Allan Nix
\$20,000
14. University of Delaware, College of Agricultural Sciences Competitive Grant 1997
1/1/97 - 12/31/97
"Expression cloning of chicken cytokines"
Co-investigator - Dr. Joan Burnside
\$25,000
15. University of Delaware, College of Agricultural Sciences Competitive Grant 1997
1/1/97 - 12/31/97
"Characterization of Mycoplasma gallisepticum transposon mutants"
Co-investigators - Dr. John E. Dohms, Ms. Patricia Whetzel
\$15,000
16. University of Delaware, College of Agricultural Sciences Competitive Grant 1997
1/1/97 - 12/31/97
"100kd heat shock protein expression in cultivars of Phaseolus lunatus"
Co-investigators - Dr. Sharon J. Keeler, Dr. Sherry L. Kitto
\$15,000
17. Southeastern Poultry & Egg Association 7/1/96 - 6/30/98
"Infectious laryngotracheitis virus: Assessment of vaccine stability and recombination potential"

\$33,000

18. University of Delaware, College of Agricultural Sciences Competitive Grant 1996
1/1/96 - 12/31/96
"Identification of the UL45 homolog of infectious laryngotracheitis virus (ILTV) and construction of a UL45-negative virus"
Co-investigator - Mr. Dean Thureen
\$17,000
19. FY1995 Delaware Research Partnership with Solvay Animal Health 3/1/95-6/30/96
"Molecular Biology of ILTV"
\$100,000
20. University of Delaware, College of Agricultural Sciences Competitive Grant 1995
1/1/95-12/31/95
"Evolutionary Relationships Among the Primitive Apterygote Insects"
Co-investigator - Dr. Robert Allen
\$13,500
- ☞ 21. USDA/CSRS National Research Initiative Competitive Grants Program 1993
9/15/93-9/30/94
"Equipment for Avian Research"
\$50,000
22. Delmarva Poultry Industry, Inc. 9/1/92-12/31/94
"Rapid identification of Delmarva infectious bronchitis virus serotypes by polymerase chain reaction"
Co-investigator - Dr. Jack Gelb, Jr.
\$20,000
- ☞ 23. USDA/CSRS National Research Initiative Competitive Grants Program 1992,
Mechanisms of Animal Disease 9/15/92-9/30/95
"Use of an alphaherpesvirus to study cell-mediated immunity in the chicken"
\$100,000
24. University of Delaware Experiment Station Hatch Project 10/1/88-9/30/95
"Laryngotracheitis virus: Identification and characterization of glycoproteins"
\$34,200
- ☞ 25. USDA/CSRS, Food and Agricultural Sciences National Needs Graduate Fellowship
Program in Poultry Biotechnology 9/1/92-8/31/96
Co-investigators - Dr. Robin Morgan, Dr. Joan Burnside
\$162,000
26. FY1993 Delaware Research Partnership with Intervet America 1/1/93-6/30/94
"Analysis of ILTV genes"

- \$90,000
27. FY1993 Delaware Research Partnership with Vineland Laboratories, Inc.
7/1/92-6/30/94
"Construction of recombinant vaccines for poultry"
\$72,000
 28. FY1992 Delaware Research Partnership with Intervet America 1/1/92-12/30/92
"Characterization of the unique short region of infectious laryngotracheitis virus"
\$99,460
 29. Nippon Zeon, Ltd. 3/30/92-7/31/92
"Evaluation of a recombinant infectious laryngotracheitis vaccine for poultry"
\$2,482
 30. University of Delaware Research Foundation Block Grant 1/15/91-6/30/92
"Agricultural biotechnology: applications to avian health and physiology"
Co-investigators - Dr. Robin Morgan, Dr. Joan Burnside
\$40,000
 31. FY1991 Delaware Research Partnership Program with Intervet America 1/1/91-12/30/91
"Construction and evaluation of viral vaccines for poultry I. ILTV vaccines"
\$115,460
 32. FY1990 Delaware Research Partnership Program with Intervet America
1/1/90-12/30/91
"Analysis of the thymidine kinase gene of infectious laryngotracheitis virus"
\$92,900
 33. USDA, Cooperative State Research Service Special Research Grants Program for Fiscal Year 1989 9/1/89-8/31/91
"In vivo and in vitro comparisons of vaccine and clinical isolates of laryngotracheitis virus"
\$48,000
 34. Delmarva Poultry Industry, Inc. 9/1/89-8/31/91
"In vivo and In vitro evaluations of vaccine and clinical isolates of laryngotracheitis virus"
Co-investigators - Dr. Conrad Pope, Dr. John K. Rosenberger
\$20,000
 35. E.I. du Pont de Nemours and Co., Inc. 2/1/90-8/31/90
"DuPont's Biolistic PDS-1000"
\$0

36. FY 1989 Delaware Research Partnership Program with Intervet America 1/1/89-12/30/89
"Development of new vaccine strains of laryngotracheitis virus"
\$98,173

37. University of Delaware Research Foundation 1/15/89-6/30/90
"Comparison of strains of infectious laryngotracheitis virus"
Co-investigator - Dr. Conrad Pope
\$14,000

TEACHING

Courses developed and/or taught at the University of Delaware

ANFS 332	Animal Diseases (3 cr) – 2008-2009
ANFS 300	Animal and Plant Genetics (1 cr Honors section) - 2008
ANSC 470/570/670	Principles of Molecular Genetics (3 cr) - 1988, 1990, 1992, 1994, 1996, 1998, 2000, 2002-2005, 2009
ANSC 870	Topics in Molecular Biology (1 cr) - 1992-1996, 2000, 2006
ANSC 865	Graduate Seminar (1 cr) – 1989-1990
ANSC/AGRI 867	Survival Skills and Ethics (2 cr) - 1997 - 98
ANSC 265	Sophomore Seminar (1 cr) – 2004-2007
AGRI 165	Mastering the Freshman Year (1 cr) – 2001-2008

Guest lectures

ANSC 635	Introduction to Virology - 1 lecture, 1990, 1992, 1993, 1995
ANSC/FREC/PLSC 270	Biotechnology: Science and Socio-Economic Issues - 2 lectures, 1990-1992, 1996-1997; 1 lecture, 1993, 1995, 1998-2001, 2004

Undergraduate instructional activities

Major Advisor - Science and Engineering Scholars - 15 students

Major Advisor - Degree with Distinction Students - 10 students

Kyle Clark - 2010

Annie Mirabito - 2010

Micestelle Lopera 2009

Lorna Dougherty 2009

Ida Chung 2006

A novel technique for identifying and characterizing strains of avian influenza virus

Jamie Ellis 2004

The phagocytic response of avian macrophage when exposed to *Escherichia coli*

Lacy Weisenberg 2002

Characterization of an avian antigen presenting protein, chDEC205

Sherri Freeman 2001

Construction and characterization of an avian macrophage EST library and the identification of an avian DEC205 homolog

John McDowell 1998

Construction of a US2 mutant of infectious laryngotracheitis virus

Keri Csencsits 1996

Sequence and analysis of a portion of the unique short region of ILTV

Jennifer Taylor 1993

Characterization of a pseudorabies virus (PRV) gIII-lacZ recombinant lacking the signal sequence

Jonathan Rayner 1993 (co-advisor with Dr. John Dohms)

Attempts to identify and clone the putative *Mycoplasma synoviae* cytoadhesin gene for the development of a species-specific nucleic acid probe

Undergraduate senior thesis committees

Department of Animal and Food Sciences

Christopher Sicuranza 2006 2nd reader

Jonathan Anobile 2004 2nd reader

Jesica Urbonas 2004 2nd reader

Emily Fillman 2nd reader

Department of Biological Sciences

Karyn Oberman 2003

Melissa Martin 2003

Stephanie Miller 2003

Erwin Puente 2003

Bevan Kirley 2003

Janine Collinge 2004

Arthur Suckow 2004

Alisha Yallowitz 2004

James O'Leary 2004

Jennifer Risser 2004

Ashley Cephas 2005
David Hall 2005
Joe Fotos 2005
Erin Kenaley 2005
Steven Pine 2005

Brain John Grindel 2008 3rd reader
Gregory Russell Madden 2008 3rd reader
Eamon John McLaughlin 2008 3rd reader
Rowan Jonathan Michael 2008 3rd reader

Department of Chemistry and Biochemistry

Maghan Cashman 2006
Eric Hardter 2006

Daniel Silverio, Blair Thornley, Megan Lombardi, Andrew Madison, Richard Karpowicz 2007

Agata Bielska, Megan Cashman, Eric Hardter, Kellie Machlus, Timothy Martin - 2006

Ionna H. Antonopoulos 2009 3rd reader
Kyle Johnson 2009 3rd reader
Stephanie L. Myrick 2009 3rd reader
Kristin M. Nuzzio 2009 3rd reader
Michael Thomas Pirnot 2009 3rd reader
Stephen Tereniak 2009 3rd reader

UNDERGRADUATE ADVISEES

~180 total; 33 current

GRADUATE STUDENTS

Major Advisor - Ph.D.

Michele Maughan Current

Travis Bliss Ph.D. 2004

Characterization of gene expression in avian macrophages using EST libraries and DNA microarrays

Current Position: Associate, Pottter, Anderson & Corroon, LLP, Wilmington, DE

David Kingsley Ph.D. 1996

Characterization of infectious laryngotracheitis virus (ILTV) glycoprotein C and studies of ILTV attachment

Current Position: USDA, Dover, DE

David Poulsen Ph.D. 1995
Characterization of the process pathway kinetics of infectious laryngotracheitis virus glycoprotein B

Current Position: Research Assistant Professor, University of Montana

Major Advisor - M.S.

Ida Chung M.S. (current)

Dean Thureen M.S. 2006
The complete nucleotide sequence and characterization of the Psittacid herpesvirus 1 (PsHV-1) genome

Michele Maughan M.S. 2006
Molecular detection and identification of avian influenza viruses by cDNA microarray

Andrew Shaffer M.S. 2005
Characterization of glycoprotein C deficient mutants of infectious laryngotracheitis virus

Anjana Agarwal M.S. 1998
Sequence analysis of a 5.6 kb *SacI* fragment of infectious laryngotracheitis virus which contains the glycoprotein C gene

Brewster Kingham M.S. 1998 (co-advisor with Dr. Jack Gelb, Jr.)

Philip Kudish M.S. 1996 (co-advisor with Dr. Jack Gelb, Jr.)
Mutations in the S1 subunit of the attachment/fusion glycoprotein gene of avian infectious bronchitis virus are associated with attenuation

Karen Reed M.S. 1993 (co-advisor with Dr. Jack Gelb, Jr.)
Sequencing infectious bronchitis virus S1 genes and serotype-specific primer design for polymerase chain reaction diagnosis

David Poulsen M.S. 1993
Identification of the infectious laryngotracheitis virus glycoprotein B gene

James Hazel M.S. 1992
Molecular characterization of infectious laryngotracheitis virus: restriction enzyme analysis and creation of a genomic DNA library

Stuart Rabin M.S. 1991

Identification of the pseudorabies virus homolog of the herpes simplex virus type one UL3 gene

Committee Member

Deanna Borchardt Steiger M.S. 2006 Entomology and Applied Ecology
(Prof. Clifford Keil)
 Optimization and use of a voltage clamp assay with insect midgut tissues

Joseph J. Gillespie M.S. 2001 Entomology and Applied Ecology
(Prof. Douglas W. Tallamy)
 Inferring phylogenetic relationships among basal taxa of the leaf beetle tribe Luperini
 (Chrysomelidae: Galerucinae) through the analysis of mitochondrial and nuclear DNA
 sequences

Patricia Whetzel Ph.D. 1998 Animal and Food Sciences
(Prof. John Dohms)
 Development and characterization of a transposon generated *Mycoplasma gallisepticum*
 mutant library