James E. Maruniak

Associate Professor

Contact

University of Florida
Entomology and Nematology Dept.
Building 970, Natural Area Dr. (Steinmetz Hall)
Gainesville, FL 32611

Email: marun@ufl.edu

Phone: (352) 273-3960

(80% Research, 20% Teaching)

Education

- B.S., 1972, Florida State University (Biology)
- M.S., 1974, Florida State University (Biochemical Genetics) -- Advisor, Dr. A. Gib DeBusk
- Ph.D., 1979, University of Texas (Invertebrate Virology) -- Advisor, Dr. Max D. Summers
- National Institutes of Health Postdoctoral Associate, 1979-1981, Yale University School of Medicine (Molecular Virology) -- Advisor, Dr. Dennis L. Knudson

Relevant Employment History

- 1981-1982, Research Associate, Yale University School of Medicine
- 1982-1987, Assistant Professor, Department of Entomology, University of Florida
- 1987-Present, Associate Professor, Department of Entomology, University of Florida
- 1994-Present Affiliate Faculty member in the Microbiology & Cell Science Department

Research Responsibilities

- The surveillance study of virus transmitted by mosquitoes collected in different locations of Alachua County, resulted in the detection of several samples infected with a virus from the Bunyaviridae family: the Tensaw virus (TSV) at the University of Florida. One of the isolates has been completely sequenced together with an isolate obtained from the CDC. Further study of the TSV will be done with the following approaches. Characterization of potential TSV hosts/reservoirs will be done by analyzing the blood meals of engorged mosquitoes collected at the same collection sites and at a similar time frame from the mosquitoes carrying the Tensaw virus. Investigation of the TSV pathogenesis will be performed by using RNA interference methodology. RNA silencing targeting TSV sequences of the non structural proteins from the small (NSs) and medium (NSm) genome segments of TSV will be tested using short 22-23 bp dsRNA fragments that induce RNA degradation via silencing complex.
- The salivary gland hypertrophy virus genome has been completely sequenced and several transcripts were confirmed from the putative open reading frames. The function and importance of some of those genes will be further analyzed by expressing the protein under the baculovirus expression system and by producing transformed insect cell lines constitutively expressing the gene of interest.
- The research program on insect viruses includes diverse approaches from molecular biology to field application of viruses as biological pesticides.
- The study of host range and virulence of insect viruses is central to furthering the use of insect viruses as biological pesticides. Therefore, molecular techniques are used to determine and elucidate the function of genes involved in pathogenesis, virulence and host specificity of these viruses.
- Some of these baculoviruses have been tested in agricultural crops here in Florida with the cooperation of industry and university scientists.
- Insect cell cultures are used extensively to study and manipulate insect pathogenic viruses. Additionally, insect baculoviruses and insect cell cultures are being used as molecular expression systems to produce important proteins for medical, veterinary and agricultural purposes.

Research Areas

- Insect virology; host range, virulence, molecular biology
- Baculovirus expression vectors
- Arbovirus epidemiology
- Mosquito microsatellites
- Genetic variation in fungal entomopathogens
- Genetic variation in microsporidia

Teaching Responsibilities

I have taught virology for 29 years in two different departments: Microbiology and Cell Science in the School of Agriculture and in Immunology and Medical Microbiology in the School of Medicine and for one year at Yale University School of Medicine. Currently, I am the coordinator and an instructor for the virology classes MCB 4503 and MCB 5505 (http://entnem.ifas.ufl.edu/maruniak/virology/). Over the years I have given lectures in Bacterial and Viral Pathogens, Insect Pathology and Biocontrol courses. I have developed and teach with Dr. Alejandra Garcia Maruniak, a hands-on methods course, ENY 6822C Molecular Biology Techniques with Invertebrates and their Pathogens. I also give four to six lectures in MCB 5252 Microbiology, Immunology and Therapeutics.

Career Publications

- Refereed papers: 60+
- Chapters in books: 7
- Miscellaneous papers: 4

Book Chapters

- Bitton, G., Maruniak, J.E., and Zettler, F.W. 1987. Virus survival in natural ecosystems. In Henis, Y. (Ed.), Survival and Dormancy of Microorganisms. Wiley, NY.
- Maruniak, J.E. 1986. Baculovirus structural proteins and protein synthesis. Pp. 129-146 in Granados, R.R., and Federici, B.A. (Eds.), The Biology of Baculoviruses. CRC Press, Inc., Boca Raton, FL.
- Maruniak, J.E. 1987. Survival of insect viruses in the environment. In Henis, Y. (Ed.), Survival and Dormancy of Microorganisms. Wiley, NY.
- Maruniak, J.E. 1994. Biological and molecular characteristics of insect viruses as biological pesticides. Pp. 221-230 in Rosen, D., Bennett, F., and Capinera, J. (Eds.), Pest Management in the Tropics - Biological Control - A Florida Perspective. Intercept Limited, Andover, UK.
- Funderburk, J., Maruniak, J., Boucias, D., and Garcia-Canedo, A.. 1992. Efficacy of baculoviruses and their impact on pest management programs. Pp. 88-97 in Green, M., Copping, L., and Rees, R. (Eds.), Pest Management in Soybean. Elsevier, Amsterdam.
- Maruniak, J.E. 1996. Productivity of insect cells for recombinant proteins. Pp. 145-148 in Vlak, J.M., de Gooijer, C.D., Miltenburger, H., and Tramper, J. (Eds.), Insect Cell Cultures: Fundamental and Applied Aspects. Kluwer Academic Publishers, Dordrecht, The Netherlands.

Book/CD

- Maruniak, J.E. 2003. General Virology, CD-ROM. Interactive Imagery Inc.
- Maruniak, J.E. 2009. General Virology, CD with book. Faulkner Press, Gainesville, FL.

Refereed Publications

- Butler, J.F., Garcia-Maruniak, A., Meek, F., and Maruniak, J.E. 2010. Wild Florida house flies (Musca domestica L.) as carriers of pathogenic bacteria. Florida Entomologist 93: 218-223.
- Grant, R.J., Kelley, K.L., Maruniak, J.E., Garcia-Maruniak, A., Barrett, T., Manire, C.A., and Romero, C.H. 2010. Expression from baculovirus and serological reactivity of the nucleocapsid protein of dolphin morbillivirus. Veterinary Microbiology 143: 384-388. Epub 2009 November 24
- Garcia-Maruniak, A., Abd-Alla, A.M.M., Salem, T.Z., Parker, A.G., Lietze, V.-U., van Oers, M.M., Maruniak, J.E., Kim, W., Burand, J.P., Cousserans, F., Robinson, A.S., Vlak, J.M., Bergoin, M., and Boucias, D.G. 2009. Two viruses that cause salivary gland hypertrophy in Glossina pallidipes and Musca domestica are related and form a distinct phylogenetic clade. Journal of General Virology 90: 334-346.
- Abd-Alla, A.M., Vlak, J.M., Bergoin, M., Maruniak, J.E., Parker, A.G., Burand, J.P., Jehle, J.A., and Boucias, D.G. (Hytrosavirus Study Group of the ICTV). 2009. Hytrosaviridae: A proposal for classification and nomenclature of a new insect virus family. Archives of Virology 154: 909-918. Epub 2009 May 21
- Salem, T.Z., Garcia-Maruniak, A., Lietze, V.-U., Maruniak, J.E., and Boucias, D.G. 2009. Analysis of transcripts from predicted open reading frames of Musca domestica salivary gland hypertrophy virus. Journal of General Virology 90: 1270-1280. Epub 2009 March 4

- Saarinen, E.V., Daniels, J.C., and Maruniak, J.E. 2009. Development and characterization of polymorphic microsatellite loci in the endangered Miami blue butterfly (Cyclargus thomasi bethunebakeri). Molecular Ecology Resources 9: 242-244. Article available online since October 2008 at: http://www3.interscience.wiley.com/cgi-bin/fulltext/121476701/PDFSTART
- Watts, S.L., Garcia-Maruniak, A., and Maruniak, J.E. 2009. Tensaw virus genome sequence and its relation to other Bunyaviridae. Virus Genes 39: 309-318.
- Rios, L.M.V., Shue, J.-J., Day, J.F., Maruniak, J.E., Zaretsky, H., and Long, M.T. 2009. Extrinsic risk factors associated with West Nile virus infection in Florida horses. Medical and Veterinary Entomology 23: 357-366.
- Watts, S.L., Fitzpatrick, D.M., and Maruniak, J.E. 2009. Blood meal identification from Florida mosquitoes (Diptera: Culicidae). Florida Entomologist 92: 619-622.
- Garcia-Maruniak, A., Maruniak, J.E., Farmerie, W., and Boucias, D.G. 2008. Sequence analysis of a non-classified, non-occluded DNA virus that causes salivary gland hypertrophy of Musca domestica, MdSGHV. Virology 377: 184-196.
- Salem, T.Z., and Maruniak, J.E. 2007. A universal transgene silencing approach in baculovirus-insect cell system. Journal of Virological Methods 145: 1-8.
- Bracht, A.J., Brudek, R.L., Ewing, R.Y., Manire, C.A., Burek, K.A., Rosa, C., Beckmen, K.B., Maruniak, J.E., and Romero, C.H. 2006. Genetic identification of novel poxviruses of cetaceans and pinnipeds. Archives of Virology 151: 423-438.
- Lauzon, H.A.M., Garcia-Maruniak A., Zanotto, P.M. de A., Clemente J.C., Herniou, E.A., Lucarotti, C.J., Arif, B.M., and Maruniak, J.E. 2006. Genomic comparison of Neodiprion sertifer and Neodiprion lecontei nucleopolyhedroviruses and identification of potential hymenopteran baculovirus specific ORFs. Journal of General Virology 87: 1477-1489.
- Rodrigues, S.G., and Maruniak, J.E. 2006. Blood meal identification from mosquitoes collected at a commercial alligator farm. Journal of the American Mosquito control Association 22: 557-560.
- Oliveira, J.V., Wolff, J.L., Garcia-Maruniak, A, Ribeiro, B.M., de Castro, M.E., de Souza, M.L., Moscardi, F., Maruniak, J.E., and Zanotto, P.M. 2006. Genome of the most widely used viral biopesticides: Anticarsia gemmatalis multiple nucleopolyhedrovirus. Journal of General Virology 87: 3233-3250.
- Rios, L., and Maruniak, J. (April 2004). Asian tiger mosquito, Aedes albopictus (Skuse). UF/IFAS Featured Creatures, EENY-319. http://creatures.ifas.ufl.edu/aquatic/asian_tiger.htm
- Garcia-Maruniak, A., Maruniak, J.E., Zanotto, P.M.A., Doumbouya, A.E., Liu, J.-C., Merritt, T.M., and Lanoie, J.S. 2004. Sequence analysis of the genome of the Neodiprion sertifer nucleopolyhedrovirus. Journal of Virology 78: 7036-7051.
- Preston, J.F., Dickson, D.W., Maruniak, J.E., Nong, G., Brito, J.A., Schmidt, L.M., and Giblin-Davis, R.M. 2003. Pasteuria spp.: Systematics and phylogeny of these bacterial parasites of phytopathogenic nematodes. Journal of Nematology 35: 198-207.
- Zaki, T., and Maruniak, J.E. 2003. Three polymorphic genes encoding a depressant toxin from the Egyptian scorpion Leiurus quinquestriatus quinquestriatus. Toxicon 41: 109-113.
- Levy, H., Garcia-Maruniak, A., and Maruniak, J. E. 2002. Strain identification of Spodoptera frugiperda (Lepidoptera: Noctuidae) insects and cell line: PCR-RFLP of cytochrome oxidase C subunit I gene. Florida Entomologist 85: 186-190.
- Ribeiro, B.M., Gatti, C.D.C., Costa, M.H., Moscardi, F., Maruniak, J.E., Possee, R.D., and Zanotto, P.M.A. 2001. Construction of a recombinant Anticarsia gemmatalis nucleopolyhedrovirus (AgMNPV-2D) harbouring the b-galactosidase gene. Archives of Virology 146: 1355-1367.
- Nguyen, K.B., Maruniak, J., and Adams, B.J. 2001. Diagnostic and phylogenetic utility of the rDNA internal transcribed spacer sequences of Steinernema. Journal of Nematology 33: 73-82.

- de Moraes, R.R., Maruniak, J.E., and Funderburk, J.E. 1999. Methods for detection of the Anticarsia gemmatalis nucleopolyhedrovirus in soil. Applied Environmental Microbiology 65: 2307-2311.
- Anderson, J.M., Preston, J.F., Dickson, D.W., Hewlett, T.E., and Maruniak, J.E. 1999. Phylogenetic analysis of the Pasteuria penetrans, a parasitic bacterium of root-knot nematodes, by 16S rRNA gene cloning and sequencing. Journal of Nematology 31: 319-325.
- Liu, J.-C., and Maruniak, J.E. 1999. Molecular characterization of genes in the gp41 region of baculoviruses and phylogenetic analysis based upon gp41 and polyhedrin genes. Virus Research 64: 187-196.
- Maruniak, J.E., Garcia-Maruniak, A., Souza, M.L., Zanotto, P.M.A., and Moscardi, F. 1999. Physical maps and virulence of Anticarsia gemmatalis nucleopolyhedrovirus genomic variants. Archives of Virology 144: 1991-2006.
- de Moraes, R.R., Funderburk, J.E., and Maruniak, J.E. 1998. Polymerase chain reaction techniques to detect multiple nucleopolyhedrovirus in Anticarsia gemmatalis (Lepidoptera: Noctuidae) and predator populations in soybean. Environmental Entomology 27: 968-975.
- Moser, B.A., Becnel, J.J., Maruniak, J.E., and Patterson, R.S. 1998. Analysis of the ribosomal DNA of the microsporidia Thelohania and Vairimorpha of fire ants. Journal of Invertebrate Pathology 72: 154-159.
- de Moraes, R.R., and Maruniak, J.E. 1997. Detection and identification of multiple baculoviruses using the polymerase chain reaction and restriction endonuclease analysis. Journal of Virological Methods 63: 209-217.
- Garcia-Maruniak, A., Pavan, O.H.O., and Maruniak, J.E. 1996. A highly variable region of Anticarsia gemmatalis nuclear polyhedrosis virus contains repeated DNA sequences. Virus Research 41: 123-132.
- Liu, J.-C., Boucias, D.G., Pendland, J.C., Liu, W.-Z., and Maruniak, J. 1996. The mode of action of Hirsutellin A on eukaryotic cells. Journal of Invertebrate Pathology 67: 224-228.
- Vilarinhos, P. de T.R., Maruniak, J.E., and Hall, D.W. 1996. Characterization and biological activity of a Brazilian isolate of Bacillus sphaericus (Neide) highly toxic to mosquito larvae. Memorias do Instituto Oswaldo Cruz, Rio de Janeiro 91: 771-776.
- Maruniak, J.E. 1996. Productivity of insect cells for recombinant proteins. Cytotechnology 20: 145-148.
- Liu, J.-C., and Maruniak, J.E. 1995. Nucleotide sequence and transcriptional analysis of the gp41 gene of Spodoptera frugiperda nuclear polyhedrosis virus. Journal of General Virology 76: 1443-1450.
- Maruniak, J.E. 1994. Biological and molecular characteristics of insect viruses as biological pesticides. In Rosen, D., Bennett, F., and Capinera, J. (Eds.), Pest Management in the Tropics - Biological Control - A Florida Perspective. Intercept, Andover, England.
- Maruniak, J.E., Garcia-Canedo, A., and Rodrigues, J.J.S. 1994. Cell lines used for the selection of recombinant baculovirus. In Vitro Cellular and Developmental Biology 30A: 283-286.
- Fuxa, J.R., Maruniak, J.E., and Richter, A.R. 1994. Characterization of the DNA of a nuclear polyhedrosis virus selected for an increased rate of vertical transmission. Journal of Invertebrate Pathology 64: 1-5.
- Tomlinson, S., Ueda, E., Maruniak, J.E., Garcia-Canedo, A., Bjes, E.S., and Esser, A.F. 1993. The expression of hemolytically active human complement protein C9 in mammalian, insect and yeast cells. Protein Expression and Purification 4: 141-148.
- Zanotto, P.M.A., Kessing, B.D., and Maruniak, J.E. 1993. Phylogenetic interrelationships among baculoviruses: Evolutionary rates and host associations. Journal of Invertebrate Pathology 62: 147-164.
- Coler, R.R., Boucias, D.G., Frank, J.H., Maruniak, J.E., Garcia-Canedo, A., and Pendland, J.C. 1993. Characterization and description of a virus causing salivary gland hyperplasia in the housefly, Musca domestica. Medical and Veterinary Entomology 7: 275-282.

- Zanotto, P.A.M., Sampaio, M.J.A., Johnson, D.W., Rocha, T.L. and Maruniak, J.E. 1992. The Anticarsia gemmatalis nuclear polyhedrosis virus polyhedrin gene region: Sequence analysis, gene product and structural comparisons. Journal of General Virology 73: 1049-1056.
- Maruniak, J.E. 1992. Contribution of molecular biology to the improvement of insect viruses as biological control products. Pesquisa Agropecuaria Brasileira, Brasilia 27: 143-150.
- Maruniak, J.E., Fiesler, S.E., and McGuire, P.M. 1990. Susceptibility of insect cells and ribosomes to ricin. Comparative Biochemistry and Physiology 96: 543-548.
- Boucias, D.G., Maruniak, J.E., and Pendland, J.C. 1989. Characterization of a non-occluded baculovirus (subgroup C) from the field cricket, Gryllus rubens. Archives of Virology 106: 93-102.
- Beard, C.B., Butler, J.F., and Maruniak, J.E. 1989. A baculovirus in the flea, Palex simulans. Journal of Invertebrate Pathology 54: 128-131.
- Maruniak, J.E. 1989. The genetic engineering of baculovirus for foreign gene expression. Memorias do Instituto Oswaldo Cruz, Rio de Janeiro 84: 61-62.
- Maruniak, J.E. 1989. Molecular biology of Anticarsia gemmatalis baculovirus. Memorias do Instituto Oswaldo Cruz, Rio de Janeiro 84: 107-111.
- Johnson, D.W., and Maruniak, J.E. 1989. Physical map of Anticarsia gemmatalis nuclear polyhedrosis virus (AgMNPV-2) DNA. Journal of General Virology 70: 1877-1883
- Sieburth, P.J., and Maruniak, J.E. 1988. Growth characteristics of a continuous cell line from the velvetbean caterpillar, Anticarsia gemmatalis, Hubner (Lepidoptera: Noctuidae). In Vitro Cellular and Developmental Biology 24: 195-198.
- Sieburth, P.J., and Maruniak, J.E. 1988. Susceptibility of an established cell line of Anticarsia gemmatalis (Lepidoptera: Noctuidae) to three nuclear polyhedrosis viruses. Journal of Invertebrate Pathology 52: 453-458.
- Gowan, T.D., and Maruniak, J.E. 1988. VIRSTOCK: Adaptable programs for computerized inventory control of microbe stock. Biotechnology Software 5: 16-17.
- Johnson, D.W., Silten, R.M., Knudson, D.L., and Maruniak, J.E. 1987. Generation of nucleic acid fragment migration distances using a digitizer and microcomputers. Biotechnology Software 4: 18-19.
- Brown, S.E., Maruniak, J.E., and Knudson, D.L. 1987. Conserved homologous regions between two baculovirus DNAs. Journal of General Virology 68: 207-212.
- Boucias, D.G., Maruniak, J.E., and Pendland, J.C. 1987. Characterization of an iridovirus isolated from the southern mole cricket, Scapteriscus vicinus. Journal of Invertebrate Pathology 50: 238-245.
- Danyluk, G., and Maruniak, J.E. 1987. In vivo and in vitro host range and virulence of SfMNPV and AcMNPV. Journal of Invertebrate Pathology 50: 207-212.
- Maruniak, J.E., Johnson, D.W., and Gowan, T.D. 1986. AgNPV replication in cell cultures and physical map of its DNA. Journal of Cellular Biochemistry 10: 49.
- Brown, S.E., Maruniak, J.E., and Knudson, D.L. 1985. Baculovirus (MNPV) genomic variants: Characterization of Spodoptera exempta MNPV DNAs and comparison with other Autographa californica MNPV DNAs. Journal of General Virology 66: 2431-2441.
- Brown, S.E., Maruniak, J.E., and Knudson, D.L. 1984. Physical map of SeMNPV baculovirus DNA: An AcMNPV genomic variant. Virology 136: 235-240.
- Maruniak, J.E., Brown, S.E., and Knudson, D.L. 1984. Physical maps of SfMNPV baculovirus DNA and its genomic variants. Virology 136: 221-234.
- Maruniak, J.E., and Summers, M.D. 1981. Autographa californica nuclear polyhedrosis virus phosphoproteins and synthesis of intracellular proteins after virus infection. Virology 109: 25-34.

- Maruniak, J.E., Summers, M.D., Falcon, L.A., and Smith, G.E. 1979. Autographa californica nuclear polyhedrosis virus structural proteins compared from in vivo and in vitro sources. Intervirology 11: 82-88.
- Maruniak, J.E., and Summers, M.D. 1978. Comparative peptide mapping of baculovirus polyhedrins. Journal of Invertebrate Pathology 32: 196-201.

Ad hoc reviewer for the following journals:

- Journal of Virology
- Journal of General Virology
- Journal of Invertebrate Pathology
- In Vitro Cellular and Developmental Biology
- Biological Control
- Virus Research

Memberships and Activities in the Professional Societies

- American Society for Tropical Medicine and Hygiene
- American Society for Microbiology
- Phi Kappa Phi Scholastic Honor Society
- Sigma Xi Research Society
- Society for Invertebrate Pathology
- American Society for Virology
- Florida Entomological Society
- Tissue Culture Association

Undergraduate Advising

- May, Leah: Tensaw surveillance in mosquitoes collected in North Central Florida
- Maggio, Christopher: Expression of baculovirus trypsin protein
- Matt Geden: Expression of Tensaw virus glycoprotein
- Undergraduate research project on bacteriophage: Water sampling and introduction to microbiology methodology. Project participants: Chris Maggio, Alex Gener, Dat Nguyen, Steven Raymond, Victoria Strukov, Eugene Popov, Adam Rosen, Brittney Cobb, Stacy Ranson, Bryan Restauro, Eric Downes, Fiona Muhaj, Cathy Busatto, Brianna Pancione, Pablo Plasencia, Kimberly Dennis, Paul Heyliger-Fonseca.

Graduate Student and Postdoctoral Fellows trained

- Daniel Fitzpatrick, Ph.D. (degree in progress). RNA silencing of Tensaw Bunyavirus genes and escape from silencing.
- Leslie Vigeurs Rios, Ph.D. 2008. Identification of potential mosquito vectors of West Nile virus to horses in North Central Florida.
- Aissa Doumbouya, Ph.D. 2007. Microsatellite DNA analysis of four Culex pipiens quinquefasciatus (SAY) (Diptera: Culicidae) mosquito populations in Florida and their vector competence for West Nile virus.
- Saundra Garrett, M.S. 2005. Identification of potential mosquito vectors of West Nile virus on a Florida alligator farm.
- Tamer Zaki, Ph.D. 2003. Construction expression and production of a recombinant baculovirus with a scorpion toxin gene.
- Aissa Doumbouya, M.S. 2001 Construction of a restriction map and sequencing of DNA from the Neodiprion sertifer nucleopolyhedrovirus.
- Thomas Merritt, M.S. 2000. DNA sequence and phylogenetic analysis of Neodiprion sertifer (European pine sawfly) genes.
- Yong Zheng, Ph.D. 1999. Development of methods to distinguish Beauveria bassiana isolates with different biological activity to fire ants.
- Jennifer Anderson, M.S. 1998. Phylogenetic analysis of Pasteuria penetrans, a bacterial pathogen of nematodes.
- Hazel Levy, M.S. 1998. Molecular study of Spodoptera frugiperda larvae and SF-9 cell line mitochondrial genomes.
- Jaw-Ching Liu, Ph.D. 1997. Phylogenetic analysis of baculoviruses using GP41 structural protein gene and five other genes.
- Rejane de Moraes, Ph.D. 1997. Environmental detection of baculovirus species and genotypes using the polymerase chain reaction technique.
- Paulo Vilarinhos, M.S. 1991. Biological activity and biochemical characterization of a new isolate of Bacillus sphaericus (Neide) highly toxic to mosquito larvae.
- David Johnson, Ph.D. 1990. Physical maps of Anticarsia gemmatalis nuclear polyhedrosis virus.
- Paolo Zanotto, M.S. 1990. Polyhedrin gene of the Anticarsia gemmatalis nuclear polyhedrosis virus.
- Zuhair Alyaqoub, M.S. 1990. A baculovirus transfer vector containing a cDNA coding for a poliovirus protease and polymerase polypeptide and co-transfection of the DNA into insect cell cultures.
- Dave Gowan, Post-Doctoral fellow. 1987-1988. Virulence of Anticarsia gemmatalis nuclear polyhedrosis virus genotypes in multiple cell lines.
- Peggy Sieburth, Post-Doctoral fellow. 1986-1988. Development of insect cell lines capable of replicating the Anticarsia gemmatalis nuclear polyhedrosis virus and determination of host range and virulence of plaque purified isolates.
- Gregory Danyluk, M.S. 1986. Virulence of two baculoviruses in Lepidopteran cell lines and larvae and the characterization of the cell lines by isozyme analysis and restriction enzyme profiles of the mitochondrial DNA.