

**OFFICE ADDRESS**

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**RANK**

Associate Professor: Department Veterinary Diagnostic and Production Animal Medicine, College of Veterinary Medicine, Iowa State University, Ames, IA 50011

**EDUCATION AND TRAINING**

2016 – Current Associate Professor: Department Veterinary Diagnostic and Production Animal Medicine, College of Veterinary Medicine, Iowa State University, Ames, IA 50011  
2012 – 2016 Assistant Professor: Department Veterinary Diagnostic and Production Animal Medicine, College of Veterinary Medicine, Iowa State University, Ames, IA 50011  
2008 – 2012 IA State University College of Veterinary Medicine, Ames, IA  
Graduate major: Veterinary Microbiology  
2006 – 2008 IA State University College of Veterinary Medicine, Ames, IA  
Graduate major: Veterinary Microbiology  
1990 – 1994 IA State University College of Veterinary Medicine, Ames, IA  
Professional major: Veterinary Medicine  
1986 – 1990 IA State University College of Veterinary Medicine, Ames, IA  
Undergraduate major: Animal Science

**DEGREES**

2012 Doctor of Philosophy, Veterinary Microbiology, IA State University, Ames, IA  
2008 Master of Science, Veterinary Microbiology, IA State University, Ames, IA  
1994 Doctor of Veterinary Medicine, IA State University College of Vet Med, Ames, IA  
1990 Bachelor of Science, Animal Science, IA State University, Ames, IA

**EMPLOYMENT**

2016-Present Graduate Faculty, Bioinformatics and Computational Biology, College of Agriculture and Life Sciences, Iowa State University, Ames, IA  
2016-Present Associate Professor: Department Veterinary Diagnostic and Production Animal Medicine, College of Veterinary Medicine, Iowa State University, Ames, IA 50011  
2015-Present Graduate Faculty, Interdepartmental Microbiology, College of Agriculture and Life Sciences, Iowa State University, Ames, IA  
2013-Present Graduate Faculty, Veterinary Microbiology and Preventive Medicine, College of Veterinary Medicine, Iowa State University, Ames, IA  
2012-2016 Assistant Professor, Veterinary Diagnostic and Production Animal Medicine, College of Veterinary Medicine, Iowa State University, Ames, IA  
2008-2012: Clinician, Veterinary Diagnostic and Production Animal Medicine, College of Veterinary Medicine, Iowa State University, Ames, IA  
2006-2008: Veterinary Medical Officer, USDA-ARS National Animal Disease Center, Ames, IA  
Primary investigator in applied research evaluating the pathogenesis of swine viral diseases including Porcine Circovirus type 2b. Assisted with planning and executing experiments with influenza and PRRSV in swine.  
1994-2006: Veterinarian and Partner, Marcus/Remsen Veterinary Clinic, PLC, Marcus, IA  
Veterinary practitioner and co-owner of two mixed animal clinics providing preventative medicine, diagnostics and surgery for production and companion animals.

**LICENSURE / ACCREDITATION / CERTIFICATIONS**

2019 - Present	Executive Veterinary Program, Champaign-Urbana, IL
2015 - Present	Good Clinical Practice Training, Iowa State University, Ames, IA
1994 - Present	IA Board of Veterinary Medicine, Des Moines, IA
1994 - Present	National Veterinary Accreditation, APHIS, USDA

**PROFESSIONAL PRACTICE / SERVICE DUTY**

<i>Number of Cases/Calendar Year</i>			
<b>Species</b>	<b>Jan - Dec 2017</b>	<b>Jan - Dec 2018</b>	<b>Jan - Dec 2019</b>
Avian	451	411	424
Bovine	1,787	2,139	2,333
Camelid	4	12	4
Canine	106	88	126
Caprine	20	43	39
Deer / Elk	6	5	5
Equine	35	109	123
Exotic mammal	2	0	0
Feline	19	24	40
Marsupial	1	1	1
Non-animal	77	46	41
Ovine	16	15	22
Porcine	26,754	34,663	43,274
Raccoon	1	6	8
Rodent	2	3	10
Other	0	53	58
<b>Molecular</b>	<b>28,626</b>	<b>37,035</b>	<b>45,598</b>
<b>Histopathology</b>	<b>655</b>	<b>583</b>	<b>910</b>
<b>TOTAL</b>	<b>29,281</b>	<b>37,618</b>	<b>46,508</b>

**HONORS / AWARDS / RECOGNITION**

- 2019: Zoetis Excellence in Veterinary Research Award
- Recognition for outstanding achievement in veterinary research at Iowa State University.
- 2014: Certificate of Merit, USDA/NADC/ARS  
Direct/indirect support Virus & Prion Research Unit
- Recognition for research collaboration between Dr. Phil Gauger and NADC regarding the isolation and characterization of a human-like H3N2/H3N1 influenza virus in swine detected initially in diagnostic submissions to the ISU VDL.
- 2013: Veterinary Pathology, #4 most important veterinary pathologists in 2012  
ACVP and ASVCP Annual Meeting  
<http://www.acvp.org/members/pdf/ACVP%202013%20Business%20Meeting.pdf>
- The ACVP and ASVCP select five manuscripts based on number of citations as the most important published in the journal *Veterinary Pathology*.
- 2010: American College of Veterinary Microbiologists Award
- Graduate student award for best *in vivo* presentation at CRWAD

- 2009: Alex Hogg Memorial Scholarship
- American Association of Swine Veterinarians award to a member and veterinarian continuing their graduate education.
- 2008: Golden Key International Honor Society
- 2008: The National Scholars Honor Society
- 2007: Certificate of Merit, USDA/ARS/NADC
- Superior research contribution to emerging viral diseases; Virus & Prion Res Unit
- Recognition of research associated with the emerging PCV2b virus in gnotobiotic pigs
- 2007: Gamma Sigma Delta Honor Society of Agriculture
- 2007: Phi Kappa Phi Honor Society
- 1993: Purina Mills Swine Proficiency Award
- 1992: Pfizer Animal Health Veterinary Scholarship
- 1987: Alpha Zeta Honorary Society – IA State University

### PROFESSIONAL AND ACADEMIC ASSOCIATIONS

- 2015 – Present American Association of Veterinary Laboratory Diagnosticians
- 1998 – Present American Veterinary Medical Association
- 1998 – Present Iowa Veterinary Medical Association
- 1994 – Present American Association of Swine Veterinarians
- 1994 – Present Veterinary Medical Alumni Association

### POST-DOCTORAL RESEARCHERS SUPERVISED

#### Post-doc Researcher: Current

<u>Name</u>	<u>Sponsor</u>	<u>Responsibility</u>	<u>Dates</u>
Dr. Aditi Sharma	Iowa State University	Bioinformatics and computational biology	2018-Present

#### Post-doc Researcher: Completed

<u>Name</u>	<u>Sponsor</u>	<u>Responsibility</u>	<u>Dates</u>
Dr. Jie Park	Boehringer-Ingelheim	Virus isolation VDL samples Emerging viruses	2016-2018
Dr. Qi Chen	Iowa State University	Pathology trainee Virology projects Next generation sequencing	2016-2019

### STUDENTS SUPERVISED

#### Graduate Students: Current

<u>Name</u>	<u>Degree</u>	<u>Role in Graduate Program</u>	<u>Dates</u>
Cristina Santana	PhD	Co-Major Professor	2018-Present
Michael Zeller	PhD	Co-Major Professor	2016-Present
Michael Welch	PhD	Major Professor	2016-Present
Nicholas Streauslin	MS	Major Professor	2017-Present
Franco Matias Ferreyra	PhD	Committee member	2017-Present
Andrew Harley	PhD	Committee Member	2017-Present

Will Lopez	PhD	Committee Member	2018-Present
Marcelo Nunes-De-Almeida	PhD	Committee Member	2018-Present
Loni Schumacher	PhD	Committee Member	2018-Present
Alexa Buckley	PhD	Committee Member	2019-Present
Amanda Anderson	MS	Committee Member	2019-Present

**Graduate Students: Completed**

<u>Name</u>	<u>Degree</u>	<u>Role in Graduate Program</u>	<u>Dates</u>
Dr. Drew Magstadt	MS	Major Professor	2013-2015
Dr. Qi Chen	PhD	Committee Member	2013-2016
Lacey Marshall Lund	MS	Co-Major Professor	2015-2016
Joseph Thomas	MS	Committee Member	2014-2016
James Carlson	MS	Major Professor	2015-2017
Franco Matias Ferreyra	MS	Committee member	2015-2017
Paisley Canning	PhD	Committee Member	2014-2017
Marisa Rotolo	PhD	Committee Member	2013-2017
Shahan Azeem	PhD	Committee Member	2015-2018
Jermilia Charles	PhD	Committee Member	2015-2019

**Professional Students**

<u>Name</u>	<u>Program/Project</u>	<u>Objective/Outcome</u>	<u>Dates</u>
Michael Berkland	AASV Student Project	PRRSV vaccination in pregnant swine Student Presentation at AASV 6 <sup>th</sup> place	Summer 2012
Joe Thomas	ISU CVM Summer Scholar Project	Porcine Chimeric Arteriviruses	Summer 2014
Scott Radke	Project Employee	Evaluation of Enterade in PEDV infected piglets	2014-2015
Blaine Johnson	Project Employee	Evaluation of Enterade in PEDV infected piglets	2014-2015
Kenneth McFarland	Project Employee	PRRSV titrations in nasal swabs, BALF and serum	2016-2017
Dalton Pottebaum	Student Employee	Influenza virus propagation, serology testing, pig experiments, PPIV-1 propagation	2019-Present

**Undergraduate Students**

<u>Name</u>	<u>Program/Project</u>	<u>Objective/Outcome</u>	<u>Dates</u>
Michael Welch	Employee, Honors	<i>Streptococcus suis</i> PCR development	Summer 2014-2015
Holly Salzbrenner	Summer Employee	PEDV pathogenesis experiments	Summer 2014
Nicholas Rohlfes	Summer Employee	PEDV pathogenesis experiments PRRSV and IAV classical virology	2016-2017
Matt Van Engen	Student Employee	Influenza virus propagation, serology testing, pig experiments	2017-Present
Dalton Pottebaum	Student Employee	Influenza virus propagation, serology testing, pig experiments, PPIV-1 propagation	2017-2019
Sam Gorden	Student Employee	Influenza virus propagation, serology testing, pig experiments, PRRSV	2018-Present
Peter Jorgensen	Student Employee	Influenza virus propagation, serology testing, pig experiments,	2018-Present
Devin Ludwig	Honors Student	Nanotrap particle evaluation with PCR	2020-Present
Gabrielle Finberg	Honors Student	Freeze-Thaw effect on PCR	2020-Present

**REFEREED PUBLICATIONS**

- \* Denotes a student/post-doc mentored, served as major professor or graduate committee member.
- Denotes the level of participation or assistance provided to the study and/or manuscript.

1. Cochrane RA, Dritz SS, Woodworth JC, Stark CR, Saensukjaroenphon M, Gebhardt JT, Bai J, Hesse RA, Poulsen EG, Chen Q, **Gauger PC**, Derscheid RJ, Zhang J, Tokach MD, Main RG, Jones CK. Assessing the effects of medium-chain fatty acids and fat sources on PEDV infectivity. *Translational Animal Science*. Volume 4, Issue 2, April 2020, txz179, <https://doi.org/10.1093/tas/txz179>
2. \*Torrents D, Miranda J, Pedrazuela R, **Gauger PC**, Ramirez A, Linhares DCL. Implementation of PRRSV status classification system in swine breeding herds from a large integrated group in Spain. *Porcine Health Manag*. 2019 Dec 15;5:26. doi:10.1186/s40813-019-0134-9. eCollection 2019. PubMed PMID: 31890251; PubMed Central PMCID: PMC6911700.
3. Wang A, Zhang J, Shen H, Zheng Y, Feng Q, Yim-Im W, **Gauger PC**, Harmon K, Zhu S, An TQ, Li G. Genetic diversity of porcine reproductive and respiratory syndrome virus 1 in the United States of America from 2010 to 2018. *Vet Microbiol*. 2019 Dec;239:108486. doi:10.1016/j.vetmic.2019.108486. Epub 2019 Nov 6. PubMed PMID: 31767088.
4. Opriessnig T, Castro AMMG, Karuppanan AK, **Gauger PC**, Halbur PG, Matzinger SR, Meng XJ. A Porcine circovirus type 2b (PCV2b)-based experimental vaccine is effective in the PCV2b-

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- Mycoplasma hyopneumoniae* coinfection pig model. *Vaccine*. 2019 Oct 16;37(44):6688-6695. doi: 10.1016/j.vaccine.2019.09.029. Epub 2019 Sep 16. PubMed PMID: 31537445.
5. Chang J, Anderson TK, Zeller MA, **Gauger PC**, Vincent AL. octoFLU: Automated Classification for the Evolutionary Origin of Influenza A Virus Gene Sequences Detected in U.S. Swine. *Microbiol Resour Announc*. 2019 Aug 8;8(32). pii:e00673-19. doi: 10.1128/MRA.00673-19. PubMed PMID: 31395641; PubMed Central PMCID: PMC6687928.
  6. Abente EJ, Rajao DS, **Gauger PC**, Vincent AL. Alphavirus-vectored hemagglutinin subunit vaccine provides partial protection against heterologous challenge in pigs. *Vaccine*. 2019 Mar 7;37(11):1533-1539. doi: 10.1016/j.vaccine.2018.12.071. Epub 2019 Feb 2. PubMed PMID: 30723064; PubMed Central PMCID: PMC6990457.
  7. \*Park JY, Welch MW, Harmon KM, Zhang J, Piñeyro PE, Li G, Hause BM, **Gauger PC**. Detection, isolation, and in vitro characterization of porcine parainfluenza virus type 1 isolated from respiratory diagnostic specimens in swine. *Vet Microbiol*. 2019 Jan;228:219-225. doi: 10.1016/j.vetmic.2018.12.002. Epub 2018 Dec 5. PubMed PMID: 30593371.
  8. Gallien S, Moro A, Lediguerher G, Catinot V, Paboeuf F, Bigault L, **Gauger PC**, Pozzi N, Berri M, Authié E, Rose N, Grasland B. Limited shedding of an S-InDel strain of porcine epidemic diarrhea virus (PEDV) in semen and questions regarding the infectivity of the detected virus. *Vet Microbiol*. 2019 Jan;228:20-25. doi: 10.1016/j.vetmic.2018.09.025. Epub 2018 Oct 11. PubMed PMID: 30593368.
  9. Wang A, Chen Q, Wang L, Madson D, Harmon K, **Gauger P**, Zhang J, Li G. Recombination between Vaccine and Field Strains of Porcine Reproductive and Respiratory Syndrome Virus. *Emerg Infect Dis*. 2019 Dec;25(12):2335-2337. doi: 10.3201/eid2512.191111. PubMed PMID: 31742529; PubMed Central PMCID: PMC6874241.
  10. Hewitt JS, Karuppanan AK, Tan S, **Gauger P**, Halbur PG, Gerber PF, De Groot AS, Moise L, Opriessnig T. A prime-boost concept using a T-cell epitope-driven DNA vaccine followed by a whole virus vaccine effectively protected pigs in the pandemic H1N1 pig challenge model. *Vaccine*. 2019 Jul 18;37(31):4302-4309. doi:10.1016/j.vaccine.2019.06.044. Epub 2019 Jun 24. PubMed PMID: 31248687.
  11. Zhang J, Nfon C, Tsai CF, Lee CH, Fredericks L, Chen Q, Sinha A, Bade S, Harmon K, Piñeyro P, **Gauger P**, Tsai YL, Wang HT, Lee PA. Development and evaluation of a real-time RT-PCR and a field-deployable RT-insulated isothermal PCR for the detection of Seneca Valley virus. *BMC Vet Res*. 2019 May 24;15(1):168. doi: 10.1186/s12917-019-1927-4. PubMed PMID: 31126297; PubMed Central PMCID: PMC6534938.
  12. Wang L, Marthaler D, Fredrickson R, **Gauger PC**, Zhang J, Burrough ER, Petznick T, Li G. Genetically divergent porcine sapovirus identified in pigs, United States. *Transbound Emerg Dis*. 2020 Jan;67(1):18-28. doi: 10.1111/tbed.13337. Epub 2019 Sep 13. PubMed PMID: 31461567.
  13. Wang A, Chen Q, Wang L, Madson D, Harmon K, **Gauger PC**, Zhang J, Li, G. Recombination between Vaccine and Field Strains of Porcine Reproductive and Respiratory Syndrome Virus. *Emerg Infect Dis*. 2019;25(12):2335-2337. <https://dx.doi.org/10.3201/eid2512.191111>

14. Yu F, Yan Y, Shi M, Liu HZ, Zhang HL, Yang YB, Huang XY, **Gauger PC**, Zhang J, Zhang YH, Tong GZ, Tian ZJ, Chen JJ, Cai XH, Liu D, Li G, An TQ. Phylogenetics, genomic recombination, and NSP2 polymorphic patterns of porcine reproductive and respiratory syndrome virus in China and the United States in 2014-2018. *J Virol*. 2020 Jan 2. pii: JVI.01813-19. doi: 10.1128/JVI.01813-19. [Epub ahead of print] PubMed PMID: 31896589.
15. Canning P, Costello N, Mahan-Riggs E, Schwartz KJ, Skoland K, Crim B, Ramirez A, Linhares D, **Gauger PC**, Karriker L. Retrospective study of lameness cases in growing pigs associated with joint and leg submissions to a veterinary diagnostic laboratory. *J Swine Health Prod*. 2019;27(3):118-124.
16. Abente EJ, Rajao DS, **Gauger PC**, Vincent AL. Alphavirus-vectored hemagglutinin subunit vaccine provides partial protection against heterologous challenge in pigs. *Vaccine*. 2019 Mar 7;37(11):1533-1539. doi: 10.1016/j.vaccine.2018.12.071.
17. Abente EJ, Rajao DS, Santos J, Kaplan BS, Nicholson TL, Brockmeier SL, **Gauger PC**, Perez DR, Vincent AL. Comparison of Adjuvanted-Whole Inactivated Virus and Live-Attenuated Virus Vaccines against Challenge with Contemporary, Antigenically Distinct H3N2 Influenza A Viruses. *J Virol*. 2018 Oct 29;92(22). pii: e01323-18. doi: 10.1128/JVI.01323-18.
18. Chen Q, Wang L, Yang C, Zheng Y, **Gauger PC**, Anderson T, Harmon KM, Zhang J, Yoon KJ, Main RG, Li G. The emergence of novel sparrow deltacoronaviruses in the United States more closely related to porcine deltacoronaviruses than sparrow deltacoronavirus HKU17. *Emerg Microbes Infect*. 2018 Jun 6;7(1):105. doi:10.1038/s41426-018-0108-z.
19. Chen Q, Wang L, Zheng Y, Zhang J, Guo B, Yoon KJ, **Gauger PC**, Harmon KM, Main RG, Li G. Metagenomic analysis of the RNA fraction of the fecal virome indicates high diversity in pigs infected by porcine endemic diarrhea virus in the United States. *Virol J*. 2018 May 25;15(1):95. doi: 10.1186/s12985-018-1001-z.
20. Gallien S, Moro A, Lediguerher G, Catinot V, Paboeuf F, Bigault L, Berri M, **Gauger PC**, Pozzi N, Authié E, Rose N, Grasland B. Evidence of porcine epidemic diarrhea virus (PEDV) shedding in semen from infected specific pathogen-free boars. *Vet Res*. 2018 Jan 24;49(1):7. doi: 10.1186/s13567-018-0505-2.
21. Gallien S, Moro A, Lediguerher G, Catinot V, Paboeuf F, Bigault L, **Gauger PC**, Pozzi N, Berri M, Authié E, Rose N, Grasland B. Limited shedding of an S-InDel strain of porcine epidemic diarrhea virus (PEDV) in semen and questions regarding the infectivity of the detected virus. *Vet Microbiol*. 2019 Jan;228:20-25. doi:10.1016/j.vetmic.2018.09.025.
22. Gallien S, Andraud M, Moro A, Lediguerher G, Morin N, **Gauger PC**, Bigault L, Paboeuf F, Berri M, Rose N, Grasland B. Better horizontal transmission of a US non-InDel strain compared with a French InDel strain of porcine epidemic diarrhoea virus. *Transbound Emerg Dis*. 2018 Dec;65(6):1720-1732. doi:10.1111/tbed.12945.
23. Gebhardt JT, Cochrane RA, Woodworth JC, Jones CK, Niederwerder MC, Muckey MB, Stark CR, Tokach MD, DeRouchey JM, Goodband RD, Bai J, **Gauger PC**, Chen Q, Zhang J, Main RG, Dritz SS. Evaluation of the effects of flushing feed manufacturing equipment with chemically treated rice hulls on porcine epidemic diarrhea virus cross-contamination during feed manufacturing. *J Anim Sci*. 2018 Sep 29;96(10):4149-4158. doi: 10.1093/jas/sky295.

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24. Kaplan BS, Souza CK, **Gauger PC**, Stauff CB, Robert Coleman J, Mueller S, Vincent AL. Vaccination of pigs with a codon-pair bias de-optimized live attenuated influenza vaccine protects from homologous challenge. *Vaccine*. 2018 Feb 14;36(8):1101-1107. doi: 10.1016/j.vaccine.2018.01.027.
  25. Opriessnig T, **Gauger PC**, Gerber PF, Castro AMMG, Shen H, Murphy L, Digard P, Halbur PG, Xia M, Jiang X, Tan M. Comparison of the efficacy of a commercial inactivated influenza A/H1N1/pdm09 virus (pH1N1) vaccine and two experimental M2e-based vaccines against pH1N1 challenge in the growing pig model. *PLoS One*. 2018 Jan 30;13(1):e0191739. doi: 10.1371/journal.pone.0191739.
  26. \*Park JY, Welch MW, Harmon KM, Zhang J, Piñeyro PE, Li G, Hause BM, **Gauger PC**. Detection, isolation, and in vitro characterization of porcine parainfluenza virus type 1 isolated from respiratory diagnostic specimens in swine. *Vet Microbiol*. 2019 Jan;228:219-225. doi: 10.1016/j.vetmic.2018.12.002.
  27. Schumacher LL, Cochrane RA, Huss AR, Gebhardt JT, Woodworth JC, Stark CR, Jones CK, Bai J, Main RG, Chen Q, Zhang J, **Gauger PC**, DeRouchey JM, Goodband RD, Tokach MD, Dritz SS. Feed batch sequencing to decrease the risk of porcine epidemic diarrhea virus (PEDV) cross-contamination during feed manufacturing. *J Anim Sci*. 2018 Nov 21;96(11):4562-4570. doi: 10.1093/jas/sky320.
  28. Souza CK, Rajão DS, Sandbulte MR, Lopes S, Lewis NS, Loving CL, **Gauger PC**, Vincent AL. The type of adjuvant in whole inactivated influenza a virus vaccines impacts vaccine-associated enhanced respiratory disease. *Vaccine*. 2018 Oct 1;36(41):6103-6110. doi: 10.1016/j.vaccine.2018.08.072.
  29. van Geelen AGM, Anderson TK, Lager KM, Das PB, Otis NJ, Montiel NA, Miller LC, Kulshreshtha V, Buckley AC, Brockmeier SL, Zhang J, **Gauger PC**, Harmon KM, Faaberg KS. Porcine reproductive and respiratory disease virus: Evolution and recombination yields distinct ORF5 RFLP 1-7-4 viruses with individual pathogenicity. *Virology*. 2018 Jan 1;513:168-179. doi:10.1016/j.virol.2017.10.002.
  30. Weiser AC, Poonsuk K, Bade SA, **Gauger PC**, Rotolo M, Harmon K, Gonzalez WM, Wang C, Main R, Zimmerman JJ. Effects of sample handling on the detection of porcine reproductive and respiratory syndrome virus in oral fluids by reverse-transcription real-time PCR. *J Vet Diagn Invest*. 2018 Nov;30(6):807-812. doi: 10.1177/1040638718805534.
  31. Yang C, Wang L, Shen H, Zheng Y, **Gauger PC**, Chen Q, Zhang J, Yoon KJ, Harmon KM, Main RG, Li G. Detection and genomic characterization of new avian-like hepatitis E virus in a sparrow in the United States. *Arch Virol*. 2018 Oct;163(10):2861-2864. doi: 10.1007/s00705-018-3925-4.
  32. Yang C, Wang L, Shen H, Zheng Y, Bade SA, **Gauger PC**, Chen Q, Zhang J, Guo B, Yoon KJ, Harmon KM, Main RG, Li G. Detection and genetic characterization of porcine pegivirus in pigs in the United States. *Transbound Emerg Dis*. 2018 Jun;65(3):618-626. doi: 10.1111/tbed.12844.
  33. \*Zeller MA, Li G, Harmon KM, Zhang J, Vincent AL, Anderson TK, **Gauger PC**. Complete Genome Sequences of Two Novel Human-Like H3N2 Influenza A Viruses, A/swine/Oklahoma/65980/2017 (H3N2) and A/Swine/Oklahoma/65260/2017 (H3N2), Detected in



- Swine in the United States. *Microbiol Resour Announc.* 2018 Nov 21;7(20). pii: e01203-18. doi: 10.1128/MRA.01203-18.
34. \*Zeller MA, Anderson TK, Walia RW, Vincent AL, **Gauger PC**. ISU FLUture: a veterinary diagnostic laboratory web-based platform to monitor the temporal genetic patterns of Influenza A virus in swine. *BMC Bioinformatics.* 2018 Nov 1;19(1):397. doi: 10.1186/s12859-018-2408-7.
  35. Chen Z, Collin E, Peddireddi L, Clement T, **Gauger P**, Hause BM. Genetic diversity in envelope genes of contemporary U.S. porcine reproductive and respiratory syndrome virus strains influences viral antigenicity. *Res Vet Sci.* 2017 Dec;115:432-441.
  36. Houston DD, Azeem S, Lundy CW, Sato Y, Guo B, Blanchong JA, **Gauger PC**, Marks DR, Yoon KJ, Adelman JS. Evaluating the role of wild songbirds or rodents in spreading avian influenza virus across an agricultural landscape. *PeerJ.* 2017 Dec 13;5:e4060.
  37. Bjustrom-Kraft J, Woodard K, Gimenez-Lirola L, Steness B, Ji J, Lasley P, Nelson E, Zhang J, Baum D, **Gauger PC**, Main R, Zimmerman JJ. Serum and mammary secretion antibody responses in PEDV-immune gilts following PEDV vaccination. *J Swine Health Prod.* 2018;26(1):34-40.
  38. Arruda B, Arruda P, Hensch M, Chen Q, Zheng Y, Yang C, Gatto IRH, Ferreyra FM, **Gauger P**, Schwartz K, Bradner L, Harmon K, Hause B, Li G. Porcine Astrovirus Type 3 in Central Nervous System of Swine with Polioencephalomyelitis. *Emerg Infect Dis.* 2017 Dec;23(12):2097-2100.
  39. Kaplan BS, Souza CK, **Gauger PC**, Stauff CB, Robert Coleman J, Mueller S, Vincent AL. Vaccination of pigs with a codon-pair bias de-optimized live attenuated influenza vaccine protects from homologous challenge. *Vaccine.* 2018 Feb 14;36(8):1101-1107.
  40. Opriessnig T, **Gauger PC**, Gerber PF, Castro AMMG, Shen H, Murphy L, Digard P, Halbur PG, Xia M, Jiang X, Tan M. Comparison of the efficacy of a commercial inactivated influenza A/H1N1/pdm09 virus (pH1N1) vaccine and two experimental M2e-based vaccines against pH1N1 challenge in the growing pig model. *PLoS One.* 2018 Jan 30;13(1):e0191739.
  41. Gallien S, Moro A, Lediguerher G, Catinot V, Paboeuf F, Bigault L, Berri M, **Gauger PC**, Pozzi N, Authié E, Rose N, Grasland B. Evidence of porcine epidemic diarrhea virus (PEDV) shedding in semen from infected specific pathogen-free boars. *Vet Res.* 2018 Jan 24;49(1):7.
  42. van Geelen AGM, Anderson TK, Lager KM, Das PB, Otis NJ, Montiel NA, Miller LC, Kulshreshtha V, Buckley AC, Brockmeier SL, Zhang J, **Gauger PC**, Harmon KM, Faaberg KS. Porcine reproductive and respiratory disease virus: Evolution and recombination yields distinct ORF5 RFLP 1-7-4 viruses with individual pathogenicity. *Virology.* 2018 Jan 1;513:168-179.
  43. Tian D, Sooryanarain H, Matzinger SR, **Gauger PC**, Karuppanan AK, Elankumaran S, Opriessnig T, Meng XJ. Protective efficacy of a virus-vectored multi-component vaccine against porcine reproductive and respiratory syndrome virus, porcine circovirus type 2 and swine influenza virus. *J Gen Virol.* 2017 Dec;98(12):3026-3036.
  44. Schumacher LL, Huss AR, Cochrane RA, Stark CR, Woodworth JC, Bai J, Poulsen EG, Chen Q, Main RG, Zhang J, **Gauger PC**, Ramirez A, Derscheid RJ, Magstadt DM, Dritz SS, Jones CK. Characterizing the rapid spread of porcine epidemic diarrhea virus (PEDV) through an animal food manufacturing facility. *PLoS One.* 2017 Nov 2;12(11):e0187309.

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45. Abente EJ, **Gauger PC**, Walia RR, Rajao DS, Zhang J, Harmon KM, Killian ML, Vincent AL. Detection and characterization of an H4N6 avian-lineage influenza A virus in pigs in the Midwestern United States. *Virology*. 2017 Nov;511:56-65.
  46. \*Park JY, Welch M, Harmon KM, Zhang J, Piñeyro PE, Li G, **Gauger PC**. Complete Genome Sequence of Porcine respirovirus 1 Strain USA/MN25890NS/2016, Isolated in the United States. *Genome Announc*. 2017 Oct 19;5(42).
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#### **REFEREED PUBLICATIONS ACCEPTED FOR PUBLICATION**

- \* Denotes a student mentored, served as major professor or graduate committee member.
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Sharma A, Zeller MA, Li G, Harmon KM, Zhang J, Hoang H, Anderson TK, Vincent AL, **Gauger PC**. Detection of live attenuated influenza vaccine virus and evidence of reassortment in the U.S. swine population. *Journal Vet Diag Invest*. February 2020.

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#### **PUBLICATIONS IN PREPARATION FOR SUBMISSION**

- \* Denotes a student mentored, served as major professor or graduate committee member.
- Denotes the level of participation or assistance provided to the study and/or manuscript.

‡ Denotes corresponding author.

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- \* Denotes a student mentored, served as major professor or graduate committee member.
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#### CONFERENCE PROCEEDINGS /ABSTRACTS SUBMITTED

- \* Denotes a student mentored, served as major professor or graduate committee member.
- # Denotes the presenter of the presentation.

1. \*Cheng TY, Henao-Diaz A, Harmon K, **Gauger P**, Wang C, Ambagala A, Buckley A, Van Geelen A, Lager K, Zimmerman J, Gimenez-Lirola L. Detection of pseudorabies virus in oral fluid specimen using real-time PCR. The 26<sup>th</sup> International Pig Veterinary Society Congress. Rio de Janeiro, Brazil. June 2-5, 2020. Abstract.

#### POSTER PRESENTATIONS

- \* Denotes a student mentored, served as major professor or graduate committee member.
- # Denotes the presenter of the presentation.

1. \*Santana C, **Gauger PC**, Vegter A, Magstadt D, Kim D, Shrestha D, Charavaryamath C, Rumbelha WK. A simple large-animal whole body inhalation exposure system to study environmentally relevant toxicant exposures. The 59<sup>th</sup> Annual Meeting of the Society of Toxicology & ToxExpo. Anaheim, CA. March 15-19, 2020. Poster 2184, p. 539.
2. Billing MF, Zhang J, **Gauger PC**, Gallup J, Goodell C. A case study for IAV reassortment: the need for a whole-herd approach with IAV control. The 2019 Allen D. Lemman Swine Conference. St. Paul, MN. September 14-17. Poster #23.

3. \*Zeller MA, Chang J, Anderson TK, Vincent AL, **Gauger PC**. N2 NA coordinated evolution with HA increases influenza A virus genetic diversity in swine. 2019 College of Veterinary Medicine Summer Scholar Research Day. Ames, IA. August 9, 2019.
4. \*Sharma A, Zeller MA, Li G, Harmon K, Zhang J, Hoang H, Anderson TK, Vincent AL, **Gauger PC**. Detection of live attenuated influenza A vaccine virus and reassortment in US swine. 2019 College of Veterinary Medicine Summer Scholar Research Day. Ames, IA. August 9, 2019.
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9. \*Sharma A, Zeller MA, Vincent AL, Harmon K, Li G, Zhang J, Anderson TK, **Gauger PC**. Characterization of a novel human seasonal H3 influenza A virus spillover endemic in US swine. The 100<sup>th</sup> Conference of Research Workers in Animal Diseases. Chicago, IL. November 2-5, 2019. Poster P178, p. 249.
10. Brand MW, Kimble JB, Kaplan B, Otis N, **Gauger PC**, Vincent AL. Vaccine-associated enhanced respiratory disease with swine influenza A viruses. The 100<sup>th</sup> Conference of Research Workers in Animal Diseases. Chicago, IL. November 2-5, 2019. Poster P201, p. 260.
11. Trevisan G, Sharma A, **Gauger PC**, Harmon K, Zhang J, Main R, Linhares D. PRRSV genetic diversity within and between USA states based on RFLP and ORF5 sequences obtained from the Iowa State University Veterinary Diagnostic Laboratory. The 2019 Allen D. Lemans Swine Conference. St. Paul, MN. September 14-17, 2019. Poster #61.
12. \*Yim-Im W, Anderson T, Harmon K, **Gauger PC**, Main R, Zhang J. Dynamic changes of PRRSV-2 genetic lineages based on ORF5 sequences in the United States from 2003-2018. The 19<sup>th</sup> International Symposium of the World Association of Veterinary Laboratory Diagnosticians. Chiang Mai, Thailand. June 19-22, 2019.
13. \*Zeller MA, Chang J, Anderson TK, Vincent AL, **Gauger PC**. N2 NA coordinated evolution with HA increases influenza A virus genetic diversity in swine. 2019 Iowa State University Research Day. Ames, IA. March 28, 2019.

14. Noel A, Mainquist-Whigham C, Creel J, **Gauger PC**. Validation of the post-mortem deep bronchial swab as an appropriate sample type for influenza A virus detection in swine. The 50<sup>th</sup> Annual Meeting of the American Association of Swine Veterinarians. Lake Buena Vista, FL. March 9-12, 2019. Poster 02, p. 250-251.
15. Allison G, **Gauger PC**, Zhang J, Spellman G. PEDV “re-breaks”: Is the enemy from within? New information on manure pits PEDV positive (PCR) after prolonged lengths of time post-disease outbreaks. The 50<sup>th</sup> Annual Meeting of the American Association of Swine Veterinarians. Lake Buena Vista, FL. March 9-12, 2019. Poster 56, p. 338.
16. Vegter A, Rumbeih W, **Gauger PC**. Effect of repeated low-level hydrogen sulfide on pathogenicity of influenza A virus in pigs. The 33<sup>rd</sup> National Conference on Undergraduate Research. Kennesaw, GA. April 11-13, 2019. Poster #5, p. 226.
17. \*Santana C, **Gauger PC**, Vegter A, Magstadt D, Rumbeih WK. Low level hydrogen sulfide and its effects on the influenza A virus pathogenicity in a swine model. Central States Society of Toxicology. September 26-27, 2019.
18. \*Santana C, **Gauger PC**, Vegter A, Magstadt D, Rumbeih WK. Effects of low level hydrogen sulfide exposure on the pathogenicity of influenza A virus pathogenicity in a swine model. The 58<sup>th</sup> Annual Meeting and ToxExpo of the Society of Toxicology. Baltimore, MD. March 10-14, 2019. Poster #2030, p. 135.
19. \*Santana C, **Gauger PC**, Vegter A, Magstadt D, Rumbeih WK. Effects of low level hydrogen sulfide exposure on the pathogenicity of influenza A virus pathogenicity in a swine model. New England Science Symposium. Boston, MA. April 6, 2019.
20. Allison G, **Gauger P**, Zhang J, Engesser M, Spellman G. PEDV, PRRSV, and Seneca Valley virus PCR positive flies (*Musca domestica*). What now? The 49<sup>th</sup> Annual Meeting of the American Association of Swine Veterinarians. San Diego, CA. March 3-6, 2018. Poster 78, p. 394.
21. Alluhaybi K, Tan S, Khan S, Gutierrez AH, Moise L, **Gauger PC**, Martin W, De Groot AS. Predicting the next pandemic using swine IAV data and immunoinformatic tools. The 99<sup>th</sup> Conference of Research Workers in Animal Diseases. Chicago, IL. December 2-4, 2018. Poster 087.
22. Carlson J, Vincent AL, Zhang J, **Gauger PC**. Serological evaluation of influenza A virus vaccine antibody responses in replacement gilts on twelve breeding farms in the United States. The 49<sup>th</sup> Annual Meeting of the American Association of Swine Veterinarians. San Diego, CA. March 3-6, 2018. Poster 48, p. 348.
23. Chen Q, Wang L, Yang C, Zheng Y, **Gauger P**, Anderson T, Harmon K, Zhang J, Yoon KJ, Main R, Li G. Identification and genetic characterization of a novel sparrow deltacoronavirus existing in swine samples. The 25<sup>th</sup> International pig Veterinary Society Congress 2018 International PRRS Symposium. Chongqing, China. June 11-12, 2018. III-033, p. 837.
24. Chen Q, Rosenberg JN, Mason DF, **Gauger PC**. Evaluation of chlorine dioxide virucidal efficacy against PEDV, PRRSV, SVA and IAV. The 25<sup>th</sup> International pig Veterinary Society Congress 2018 International PRRS Symposium. Chongqing, China. June 11-12, 2018. VII-025, p. 989.

25. Chen Q, Rosenberg JN, Mason DF, **Gauger P**. Evaluation of chlorine dioxide virucidal efficacy against PEDV, PRRSV, SVA and IAV. The 49<sup>th</sup> Annual Meeting of the American Association of Swine Veterinarians. San Diego, CA. March 3-6, 2018. Poster 49, p. 349.
26. Chen Q, Yang C, Zheng Y, **Gauger P**, Anderson T, Harmon K, Zhang J, Yoon KJ, Main R, Li G. Identification and genetic characterization of a novel deltacoronavirus. Chen Q, Gauger P. The 49<sup>th</sup> Annual Meeting of the American Association of Swine Veterinarians. San Diego, CA. March 3-6, 2018. Poster 50, p. 351.
27. **Gauger P**, Welch M, Park J, Harmon K, Zhang J, Pineyro P, Gimenez-Lirola L. Porcine parainfluenza virus type 1 (PPIV-1): Diagnostic laboratory perspective. The 49<sup>th</sup> Annual Meeting of the American Association of Swine Veterinarians. San Diego, CA. March 3-6, 2018. p. 452-457.
28. Rotolo M, Sun Y, Wang C, Gimenez-Lirola L, Bade S, Baum D, Harmon K, **Gauger P**, Hoogland M, Main R, Zimmerman J. Developing sampling guidelines for oral fluid-based PRRSV surveillance. The 25<sup>th</sup> International Pig Veterinary Society Congress 2018 International PRRS Symposium. Chongqing, China. June 11-12, 2018. VII-2-004, p. 281.
29. Santana C, **Gauger P**, Vegter A, Magstadt D, Rumberiha WK. Effects of low level hydrogen sulfide exposure on the pathogenicity of influenza A virus pathogenicity in a swine model. New England Science Symposium. Society of Toxicology. Baltimore, MD. March 10-14, 2019. P420.
30. Santana C, **Gauger P**, Vegter A, Magstadt D, Rumberiha WK. Effects of low level hydrogen sulfide exposure on the pathogenicity of influenza A virus pathogenicity in a swine model. New England Science Symposium. Central States Society of Toxicology. Manhattan, KS. October 18-19, 2018.
31. Welch M, Park J, Harmon K, Zhang J, Pineyro P, Gimenez-Lirola L, Patterson A, **Gauger P**. Pathogenesis of a Porcine Parainfluenza Virus-1 Isolate (MN25890NS/2016) in swine and diagnostic assays for detection in experimental samples. The 61<sup>st</sup> Annual American Association of Veterinary Laboratory Diagnosticians. Kansas City, MO. October 18-22, 2018. Poster 138. p. 167.
32. Welch M, Park J, Harmon K, Zhang J, Pineyro P, Gimenez-Lirola L, **Gauger P**. Pathogenesis of a Porcine Parainfluenza Virus-1 isolate in conventional and caesarean derived colostrum deprived piglets. Iowa State University Research Day. Ames, IA. March 27, 2018.
33. Welch M, Park J, Harmon K, Zhang J, Pineyro P, Gimenez-Lirola L, **Gauger P**. Pathogenesis of a Porcine Parainfluenza Virus-1 isolate in conventional and caesarean derived colostrum deprived piglets. Iowa State University College of Veterinary Medicine Research Day. Ames, IA. August 10, 2018.
34. Yang C, Wang L, Shen H, Zheng Y, Bade S, **Gauger PC**, Chen Q, Zhang J, Guo B, Yoon KJ, Harmon K, Main RG, Li G. Detection and genetic characterization of porcine pegivirus in pigs in the United States. The 25<sup>th</sup> International Pig Veterinary Society Congress 2018 International PRRS Symposium. Chongqing, China. June 11-12, 2018. I-187, p. 550.
35. Zeller M, Vincent AL, Anderson TK, **Gauger P**. Automating Genetic Classification for Hemagglutinin and Neuraminidase genes from Influenza A Viruses through Machine Learning Methods. The 25<sup>th</sup> International pig Veterinary Society Congress 2018 International PRRS Symposium. Chongqing, China. June 11-12, 2018. I-068, p. 457.

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36. Zeller M, Anderson TK, Vincent A, **Gauger P**. Automating genetic classification for hemagglutination and neuraminidase genes from influenza A viruses through machine learning methods. Iowa State University Research Day. Ames, IA. March 27, 2018.
  37. Chen Q, Wang L, Yang C, Zheng Y, **Gauger PC**, Anderson T, Harmon K, Zhang J, Yoon KJ, Main R, Li G. Identification and genetic characterization of a novel sparrow deltacoronavirus existing in swine samples. 25<sup>th</sup> International Pig Veterinary Society Congress (IPVS), ChongQing, China, June 11-14, 2018.
  38. Chen Q, Rosenberg JN, Mason DF, **Gauger PC**. Evaluation of chlorine dioxide virucidal efficacy against PEDV, PRRSV, SVA and AIV. 25<sup>th</sup> International Pig Veterinary Society Congress (IPVS), ChongQing, China, June 11-14, 2018.
  39. Zeller M, Anderson T, Vincent A, **Gauger PC**. Automating Genetic Classification for Hemagglutinin and Neuraminidase genes from Influenza A Viruses through Machine Learning Methods. 25<sup>th</sup> International Pig Veterinary Society Congress (IPVS), ChongQing, China, June 11-14, 2018.
  40. Chen Q, Rosenberg JN, Mason DF, **Gauger PC**. Evaluation of chlorine dioxide (ClO<sub>2</sub>) virucidal efficacy against PEDV, PRRSV, SVA and AIV. American Association of Swine Veterinarians Annual Meeting. San Diego, CA. March 4-6, 2018.
  41. Sinha A, Pineyro P, **Gauger PC**, Groeltz-Thrush J, Zhang J, Harmon K. Real time RT-PCR based retrospective assessment of mammalian orthoreovirus type-3 in cases of epidemic diarrhea in the U.S. swine. 60<sup>th</sup> American Association of Veterinary Laboratory Diagnosticians. October 12-18, 2017. San Diego, CA. p. 146.
  42. Zeller MA, Vincent AL, Anderson TK, **Gauger PC**. ISU FLUture: Monitoring Influenza A Virus Trends in Swine Using Diagnostic Data. Midwest Big Data Hub All-Hands Meeting. October 2-3, 2017. Omaha, NE. <http://midwestbigdatahub.org/mbdh-all-hands-2017-student-poster-session/>.
  43. Carlson J, Vincent AL, Zhang J, **Gauger PC**. Serological prevalence of three H1 phylogenetic clades and three H3 antigenic clusters of influenza A virus in breeding age swine pre-vaccination on twelve farms in the United States. American Association of Swine Veterinarians Annual Meeting. March 4-6, 2018. San Diego, CA.
  44. Abente EJ, Walia RR, Rajao DS, **Gauger PC**, Vincent AL. Detection and characterization of an H4N6 avian-lineage virus in pigs in the Midwestern United States. 36<sup>th</sup> American Society for Virology. Madison, WI. June 24-28, 2017.
  45. Zeller M, Walia RR, Vincent AL, Anderson TK, **Gauger PC**. ISU *FluView*: Using BIG DATA to find trends in Influenza Diagnostic Data in Swine. ISU Research Day. Iowa State University. March 21, 2017.
  46. Gebhardt JT, Woodworth JC, Jones CK, **Gauger PC**, Tokach MD, Stark CR, Muckey MB, Zhang J, Main RG, Dritz SS. Evaluation of the effects of flushing feed manufacturing equipment with chemically treated rice hulls on porcine epidemic diarrhea virus (PEDV) cross contamination during feed manufacturing. American Association of Swine Veterinarians Annual Meeting. February 25-28, 2017. Denver, CO.

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47. Carlson J, **Gauger PC**, Zhang J, Vincent AL. Serological of influenza A virus antibody in breeding age swine in the United States. College of Veterinary Medicine Research Symposium. January 4, 2017. Ames, Iowa.
  48. Dewell G, Harmon K, Dohlman T, Phillips P, **Gauger PC**. Comparison of an alternative diagnostic sampling technique for *Tritrichomonas foetus* in cattle. Proceedings of the 29<sup>th</sup> Congress of the World Association for Buiatrics. July 3-8, 2016. Dublin, Ireland.
  49. **Gauger PC**, Sato Y, Harmon K, Zhang J, Arruda B, Main RG, Yoon KJ. Evaluation of alternative environmental sampling matrices for AIV surveillance and stability in commercial poultry facilities. Egg Industry Center-Funded HPAI Research Update: II. Digital Display Monitor: ISU CVM. August, 2016.
  50. \*Chen Q, Thomas JT, Hunter F, **Gauger PC**, Harmon KM, Main R, Zhang J. Evaluation of Commercial Rapid PED, TGE, and Rota Ag Test Kits for Detecting Virus Pathogens in Porcine Feces. Proceedings of the 58<sup>th</sup> Annual Meeting of American Association of Veterinary Laboratory Diagnosticians. October 22-28, 2015. Providence, RI. (accepted)
  51. Dewell G, Phillips P, **Gauger PC**, Dohlman TM. Comparison of an alternative diagnostic sampling technique for *Tritrichomonas foetus* in cattle. 2015 American Association of Bovine Practitioners Annual Conference. New Orleans, LA. September 17-19, 2015.
  52. Fleck R, Amodie D, O'Brien B, **Gauger PC**, Magstadt DM. Impact of Fosterera<sup>®</sup> PRRS vaccination on lineage 1 PRRSV challenge. 2015 Allen D. Lemay Swine Conference. St. Paul, MN. September 19-22, 2015.
  53. \*Rotolo M, Gimenez-Lirola L, Abate S, Hoogland M, Wang C, Baum D, **Gauger PC**, Harmon KM, Main R, Ramirez A, Zimmerman JJ. Use of oral fluids in PEDV surveillance. The 7<sup>th</sup> International Symposium on Emerging and Re-emerging Pig Diseases. Kyoto, Japan. June 21-24, 2015,
  54. \*Magstadt D, **Gauger PC**, Madson DM, Burrough E, Arruda P, Harmon KM, Pillatzki A, Chen Q, Thomas J, Zhang J. Cross-protection after challenge with a contemporary, heterologous PRRS virus in pigs vaccinated with Fosterera<sup>™</sup> PRRSV. The 46<sup>th</sup> American Association of Swine Veterinarians Annual Meeting. Orlando, FL. February 28-March 3, 2015.
  55. Tuggle C, Rajao D, Loving CL, **Gauger PC**, Waide EH, Dekkers CM, Vincent AL. Inability of severe combined immune deficient (SCID) pigs to control IAV replication despite innate immune activation. International symposium on vaccines against antigenically variable viruses (VAAVV). Iowa State University, Ames, IA. June 18-20, 2014.
  56. Panyasing Y, Goodell C, Kittawornrat A, Wang C, Levis I, Desfresne L, Rauh R, **Gauger PC**, Zhang J, Lin K, Nezami S, Azeem S, Yoon KJ, Zimmerman J. Influenza A virus (IAV) surveillance using pre-weaning oral fluid samples. Proceedings of the 45<sup>th</sup> American Association of Swine Veterinarians Annual Meeting. Poster 66. Dallas, TX. March 1-4, 2014.
  57. Allison G, **Gauger PC**, Strobel M. Administration of oral pro: vitamin D3 plus E in drinking water of gestating sows. Proceedings of the 45<sup>th</sup> American Association of Swine Veterinarians Annual Meeting. Poster 84. Dallas, TX. March 1-4, 2014.

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58. Arruda P, Madson DM, Magstadt D, Hoang H, Sun D, Wilberts B, Bhandari M, Burrough E, Cooper V, **Gauger PC**, Harmon K, Main R, Pillatzki A, Schwartz K, Stevenson G, Zhang J, Yoon KJ. Pathogenesis of porcine epidemic diarrhea virus in CDCD neonatal piglets. Proceedings of the 45<sup>th</sup> American Association of Swine Veterinarians Annual Meeting. Poster 44. Dallas, TX. March 1-4, 2014.
  59. O'Brien B, Fleck R, **Gauger PC**, Magstadt D. Impact of Foster<sup>TM</sup> PRRS vaccination on contemporary PRRSV challenge. 2014 Allen D. Leman Swine Conference. St. Paul, MN. September 13-16, 2014.
  60. Wilberts BL, Schwartz KJ, **Gauger PC**, Burrough ER. Evidence of oxidative injury in pigs with melanosis coli. Scientific Poster Session. 64<sup>th</sup> Annual Meeting of the American College of Veterinary Pathologists, Montreal, Canada, November 16 – 20, 2013.
  61. **#Gauger PC**, Zhang J, Berkland MK, Arruda PA, Madson DM. Foster<sup>TM</sup> PRRSV exposure in gestating swine and congenital infection. 2013 Allen D. Leman Swine Conference. St. Paul, MN. September 15-17, 2013.
  62. Zhang J, **Gauger PC**, Berkland MK, Chen Q, Haney D, Thomas J. Evaluation of Foster<sup>TM</sup> PRRS vaccine shedding in growing pigs following vaccination. 2013 Allen D. Leman Swine Conference. St. Paul, MN. September 15-17, 2013.
  63. Rotolo M, Abate S, Kittawornrat A, **Gauger PC**, Harmon K, Main R, Yoon KJ, Zimmerman J. Work in Progress: Improved PCRs for Oral Fluids. American Association of Swine Veterinarians Annual Meeting. San Diego, CA. March 2-5 2013.
  64. Platt R, **Gauger PC**, Kimura K, Roth JA, Vincent AL, Loving CL, Zanella EL, Lager KM, Kehrli ME. Comparison of humoral and cellular immune responses to inactivated swine influenza virus vaccine in weaned pigs. Conference of Research Workers in Animal Disease. Chicago, IL. December 5-7, 2010. Abstract #085P.
  65. Kehrli ME, **Gauger PC**, Cheung AK, Vincent AL, Lager KM. Discovery of antinuclear antibodies in pigs infected with porcine circovirus type 2. 21<sup>st</sup> International Pig Veterinary Society. Vancouver, Canada. July 18-21, 2010. Volume 1, p. 332.

## **INVITED ORAL PRESENTATIONS / LECTURES**

### **International**

1. How do PRRSV and Influenza coinfections affect resilience in the field. Boehringer Ingelheim American PRRSpective. Puerto Vallarta, MX. April 11, 2018.
2. ISU *FLU*ture: using veterinary diagnostic laboratory data to monitor the temporal genetic patterns of influenza A virus in swine. The 49<sup>th</sup> Annual Meeting of the American Association of Swine Veterinarians Pre-conference seminar. San Diego, CA. March 3-6, 2018.
3. Influenza A viruses in swine: The North American Perspective. Sino-US Forum on Swine Industry/Nanjing Agricultural University and Iowa State University. Nanjing, China. September 18-20<sup>th</sup>, 2016.

4. Highly pathogenic avian influenza virus outbreak and diagnostics at the Iowa State University Veterinary Diagnostic Laboratory. American Association of Veterinary Laboratory Diagnosticians Annual Meeting Virology Committee panel, Providence, RI. October 23, 2015.
5. Influenza A virus in swine: diversity, diagnostics and interpretation. Annual Meeting of the American Association of Swine Veterinarians, Orlando, FL. March 2, 2015.
6. Porcine epidemic diarrhea virus: the North American Experience. Institution of Permanent Education (IPV) in Veterinary Medicine. University of Ghent; Ghent, Belgium December 12, 2014.
7. Comparison of the humoral and cell-mediated immune response to inactivated and modified live influenza A virus vaccines in swine. International symposium on vaccines against antigenically variable viruses (VAAVV). Iowa State University, Ames, IA. June 18-20, 2014.
8. “You make the call”: A rapid-fire case-based review. Seminar #2: It’s Not All Bugs and Drugs, 44<sup>th</sup> Annual Meeting of the American Association of Swine Veterinarians, San Diego, CA. March 2, 2013.

### National

1. Emerging viruses in production animals. Merck Animal Health 2019 Sequivity Symposium. Chicago, IL. October 25, 2019.
2. Influenza A virus trends in swine. Swine Medicine Education Center Talk. Iowa State University, Ames, IA. January 25, 2018.
3. Influenza A Virus in swine: ISU VDL Update. ISU Swine Disease Conference. November 2-3, 2017. Ames, IA.
4. Overview of Influenza A virus in Swine in the United States. The Swine Medicine Talks: An AASV and SMECast Series for Veterinary Students. Webinar Series. January 25, 2018.
5. Porcine Parainfluenza virus type 1 (PPIV-1) disease, diagnostics, and clinical significance. Swine Disease Conference for Swine Practitioners. IA State University, Ames, IA. November 3-4, 2016.
6. Influenza A virus in swine: Influenza Diagnostics - The Antigen, Antibody and Avian Influenza Virus in Swine. Boehringer Ingelheim Technical Services Meeting. Honey Creek Resort, Moravia, IA. May 18-19, 2015.
7. Influenza A virus in swine: Diagnostic data from the ISU Veterinary Diagnostic Laboratory. Symposium of Computational Resources for Swine Viral Diseases. Ames, IA. June 8-11, 2015.
8. Influenza A virus in swine IAV-S: Overview. Boehringer Ingelheim Technical Services Meeting. St. Joseph, MO. January 7, 2015.
9. The changing face of Influenza A viruses in swine (IAV-S) a look at the ISU-VDL USDA IAV-S surveillance data. 22<sup>st</sup> Annual Swine Disease Conference for Swine Practitioners. IA State University, Ames, IA. November 13-14, 2014.



10. Porcine reproductive and respiratory syndrome virus: diagnostics, sequencing and dendrogram analysis. Merck Technical services webinar. Ames, IA. October 27, 2014.
11. Porcine epidemic diarrhea virus in North America. Boehringer Ingelheim Seminar. World Pork Expo, Des Moines, IA. June 5, 2014.
12. Understanding and interpreting swine influenza virus sequencing and it's applicability in the field. Boehringer Ingelheim Veterinary Liaison Conference Call. Ames, IA. June 21, 2013.
13. Swine influenza virus: epidemiology and vaccine concerns. Swine Disease Conference for Swine Practitioners. Ames, IA. November 10-11, 2011.
14. Porcine Respiratory Disease Complex trends and diagnostics for practitioners. Swine Disease Conference for Veterinarians. Ames, IA. November 5-6, 2009.
15. Experimental infection with PCV2a and PCV2b in gnotobiotic swine. Swine Disease Conference for Swine Practitioners. Ames, IA. November 6-7, 2008.

### State

1. Porcine Parainfluenza Virus Type 1: Emerging Porcine Respiratory Virus? Merck PPIV-1 Webinar. June 15, 2017. Ames, IA
2. Porcine epidemic diarrhea virus: the American experience. Iowa Farm Bureau Annual Meeting: educational seminar. Des Moines, IA. December 2, 2014.
3. Porcine epidemic diarrhea virus: what have we learned? Spring 2014 Purina Swine Feed Sales Meeting. Des Moines, IA. March 25-27, 2014.
4. Porcine epidemic diarrhea virus: disease, diagnostics and future perspectives. Iowa Veterinary Medical Association Winter Conference. Ames, IA. February 12, 2014.
5. Porcine respiratory and enteric disease diagnostics: utilizing appropriate tools for success. IA Pork Regional Conferences/IA Pork Producers Association. Carroll, Sheldon, Nashua, Iowa City, IA. February 25, 26, 27, 28, 2013.
6. Diagnostic considerations in postweaning enteric disease detection and diagnosis. 20<sup>th</sup> Annual Swine Disease Conference for Swine Practitioners. Ames, IA. November 8-9, 2012.
7. Trends in Antibiotic Sensitivity Patterns at the ISU Vet Diagnostic Lab. 97<sup>th</sup> Annual Meeting Lewis and Clark Veterinary Conference sponsored by Interstate Veterinary Medical Association, Inc. South Sioux City, NE. October 5-7, 2011.
8. Swine Viral Disease Update. 96<sup>th</sup> Annual Meeting Lewis and Clark Veterinary Conference/Interstates Veterinary Association. South Sioux City, NE, October 6-8, 2010.

### Regional

1. Emerging Infectious Diseases and Highly Pathogenic H5N2 in the United States. Zoetis New Veterinary Network Teleconference. Ames, IA. July 9, 2015.

2. PCV2 update, *Mycoplasma hyopneumoniae* and influenza A virus diagnostics. Merck Animal Health G2 Launch Meeting. Okoboji, IA. October 10, 2013.
3. Iowa State University Diagnostic Laboratory Update and Case Presentation. North Central IA Veterinary Medical Association Annual Meeting. Fort Dodge, IA. May 9, 2011.
4. Importance of porcine respiratory diagnostics: utilizing appropriate tools for success. Boehringer-Ingelheim Swine Seminar. Aberdeen, SD, August 15, 2012. Mitchell, SD, August 16, 2012.
5. Characterization of vaccine associated enhanced respiratory disease (VAERD) in swine administered an inactivated  $\delta$ -cluster influenza vaccine and challenged with pandemic A/H1N1 virus. Boehringer-Ingelheim Seminar. Ames, IA. April 25, 2012.
6. ISU-VDL overview and diagnostic cases. Northcentral IA Veterinary Association Conference. Fort Dodge, IA. May 10, 2011.
7. Interesting Diagnostic Cases at the ISU-VDL. Northcentral IA Veterinary Association Conference. Fort Dodge, IA, July 17, 2009.
4. Characterization of the leukogram in PCV2 infected germ-free pigs. 46<sup>th</sup> North Central Veterinary Laboratory Diagnosticians Conference. Ames, IA, June 7-8, 2007.

### Local

1. Pathogenesis of a parainfluenza virus associated with respiratory disease in swine. Biomedical Sciences Seminar. Iowa State University College of Veterinary Medicine. November 2, 2017.
2. Influenza A virus in swine: Vaccine associated enhanced respiratory disease (VAERD) & immune response to inactivated and live-attenuated vaccines in swine. National Animal Disease Center Noon Seminar. Ames, IA. April 16, 2012.
3. Influenza A virus in swine: epidemiology and ecology. Mobley Seminar. Ames, IA. December 5, 2012.
4. Diagnosing lameness in swine. ISU Swine Peer Group Meeting. Ames, IA. May 13, 2009.

### **SCIENTIFIC PRESENTATIONS / INSTITUTIONAL SEMINARS**

1. **Gauger PC**, Anderson TK, Zeller M. Influenza A virus bioinformatics workshop. ISU Swine Disease Conference. October 31, 2018. Ames, IA.
2. **Gauger PC**, Anderson TK, Zeller M. Influenza A virus bioinformatics workshop. American Association of Swine Veterinarians Annual Meeting. February 25, 2017. Denver, CO.
3. **Gauger PC**, Anderson TK, Zeller M. Influenza A virus bioinformatics workshop. The Hanor Company. May 18, 2017. Ames, IA.
4. **Gauger PC**, Anderson TK, Zeller M. Influenza A virus bioinformatics workshop. Zoetis. May 11, 2017. Ames, IA.

5. **Gauger PC**, Anderson TK, Zeller M. Influenza A virus bioinformatics workshop. ISU Swine Disease Conference. November 1, 2017. Ames, IA.
6. **Gauger PC**. Influenza A Virus in Swine: Overview of the virus, clinical disease, genetic diversity, diagnostics, and current vaccines. Boehringer-Ingelheim Vetmedica DVM Swine Academy. Ames, Iowa. June 26, 2016.
7. **Gauger PC**. Diagnostic submission guidelines and process, porcine respiratory, enteric, multisystemic and reproductive disease seminar. North Carolina State University College of Veterinary Medicine Swine Selective. North Carolina State University, Raleigh, NC. April 24 – 26, 2013.

#### **PATENTS & INTELLECTUAL PROPERTY DISCLOSURES**

1. A contemporary U.S. Seneca Valley virus isolate for depositing into American Type Culture Collection. Inventors: Zhang J, **Gauger PC**. Iowa State Research Foundation (ISURF #05047). December 10, 2019.
2. Isolation and Characterization of Porcine Sapelovirus Strain US/ISU269088/18. Inventors: Arruda BA, Chen Q, **Gauger P**, Schwartz K, Zhang J. Iowa State University Research Foundation (ISURF # 62/774,511). December 3, 2018.
3. Isolation of four Porcine Parainfluenza Virus type 1 in cell culture from clinical samples. Inventors: **Gauger PC**, Park J, Harmon K, Zhang J, Pineyro P. Iowa State University Research Foundation (ISURF # 04565 - Gauger - Novel PPIV-1 isolates). November, 2016
4. Isolate and characterization of contemporary U.S. Senecavirus A. Inventors: Zhang J, Chen Q, **Gauger PC**, Harmon K, Pineyro P. Iowa State University Research Foundation (ISURF # 04422). September, 2016.
5. Isolation of porcine epidemic diarrhea virus U.S. variant strain in cell culture. (2014). Inventors: Jianqiang Zhang, Qi Chen, **Phillip Gauger**, and Darin Madson. Iowa State University Research Foundation (ISURF) #04241

#### **TEACHING RESPONSIBILITIES**

##### Instructor-in-charge:

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|--------------|---|
| 2012-Present | Diagnostic Laboratory Practicum (VDPAM 455), “Molecular Diagnostics”. Co-instructor-in-charge |
| 2013-Present | Veterinary Microbiology and Preventive Medicine Special Topics (VMPPM 699), variable credits. |

##### Lecturer:

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| 2016-Present | Diagnostic Bacteriology (VDPAM 488), “Molecular diagnostics in clinical bacteriology”.                    |
| 2015-2016    | Virology (MICRO 408), “Techniques in classical virology”.   |
| 2013-Present | Introduction to Diagnostic Medicine (VDPAM 456X), “Optimizing detection of viruses: diagnostic virology”. |
| 2013 – 2014  | Veterinary Technician Internship Program (VTIP), “Molecular Diagnostics”                                  |
| 2009         | Veterinary Diagnostic and Production Animal Medicine (VDPAM 340). Clinical Foundations I.                 |

**RESEARCH PROPOSALS / GRANTS / CONTRACTS FUNDED**

- \* Denotes a student mentored, served as major professor or graduate committee member.
- Denotes the level of participation or assistance provided to the study and/or manuscript.
1. **Gauger P**, Vincent A, Anderson T, Li G, Eulenstein O. Rapid evolution of influenza A viruses in swine results in zoonotic viruses with human pandemic potential. Defense Advanced Research Projects Agency/Biological Technologies Office. March 1, 2020 – February 28, 2024.
    - Requested \$2,498,697 / Funded 2,465,697
  2. **Gauger P**, Rumbelha W, Radke S, Sahin O, Imerman P, Harmon K. ISU Vet-LIRN Infrastructure Grant. HHS-Food & Drug Administration (FDA). August 1, 2017 – May 31, 2021.
    - Requested \$199,735 / Funded \$199,735
  3. Yoon KJ, Cho M, **Gauger PC**. Broadening cross protective immunity against swine influenza viruses: a path toward a universal influenza vaccine. National Pork Board. June 1, 2019 – May 31, 2020.
    - Requested \$107,597 / Funded \$59,986
  4. Yoon KJ, Cho M, **Gauger PC**. Attempts to broaden cross-protective immunity against swine influenza viruses. Iowa Pork Producers Association. September 1, 2019 – August 30, 2020.
    - Requested \$63,583 / Funded \$63,583
  5. Opriessnig T, **Gauger PC**, Halbur P, Moise L, De Groot A. Development of a prime-boosting AIV vaccine protocol to promote strong cellular and humoral immune responses in vaccinated pigs while remaining safe. Iowa Pork Producers Association. September 1, 2019 – August 31, 2020.
    - Requested \$86,018 / Funded \$86,018
  6. Opriessnig T, Wannemuehler M, **Gauger PC**. Development of a novel vaccine against PRRSV: Induction of humoral and cell-mediated immunity. Vaccines and Immunotherapy Seed Grant Funding. December 1, 2019 – May 31, 2020.
    - Requested \$39,997 / Funded \$39,997
  7. Opriessnig T, Halbur P, **Gauger PC**. Comparison of intranasal & intramuscular administration routes of a novel universal pig M2e flu vaccine. Iowa Livestock Health Advisory Council. July 1, 2019 – June 30, 2020.
    - Requested \$25,000 / Funded \$25,000
  8. Li G, **Gauger PC**, Burrough E, Zhang J, Wang L, Petznick T. Case investigation and development of improved diagnostics for porcine sapovirus. Swine Health Information Center. July 1, 2019 – June 30, 2020.
    - Requested \$46,456 / Funded \$46,456
  9. **Gauger PC**. MORRISStone Fellowship. Pipestone Veterinary Clinic, Pipestone, MN. July 1, 2019 – June 30, 2020.
    - Requested \$15,000 / Funded \$15,000
  10. **Gauger PC**, Harmon K, Pineyro P, Zhang J. Porcine parainfluenza type-1 Vaccine Challenge Study. Merck Animal Health. August 2018 – August 2019.
    - Requested \$36,978 / Funded \$36,978

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11. Harmon K, **Gauger P**, Bradner L, Main R. Development of PCR-clamping assays for the preferential amplification of wild-type PRRSV virus in a vaccine-like/wild-type mix. AAVLD and ThermoFisher Grants for Innovation in Veterinary Diagnostic Medicine. October 2018 – September 2019.
    - Requested \$24,770 / Funded \$24,770
  12. Opriessnig T, Halbur P, **Gauger P**. Comparison of intranasal and intramuscular administration routes of novel monovalent and bivalent universal pig M2e flu vaccines in the pig model. Iowa Livestock Health Advisory Council. July 1, 2018 – June 30, 2019.
    - Requested \$25,000 / Funded \$25,000
  13. Zhang J, **Gauger P**, Harmon K, Main R. Development and Validation of Real-time RT-PCR Assays for the Detection of Swine Acute Diarrhea Syndrome Coronavirus (SADS-COV) and Investigation of its Presence in US Swine. Iowa Pork Producers Association. August 2018 – September 2019.
    - Requested \$76,695 / Funded \$76,695
  14. Zhang J, Li G, **Gauger P**, Harmon K, Magstadt D, Yim-Im W. Investigation of capabilities of Sanger sequencing and next-generation sequencing technologies to differentiate PRRSV-2 vaccine strains from field strains when they are co-present in a single sample. Iowa Livestock Health Advisory Council. July 1, 2018 – June 30, 2019.
    - Requested \$25,000 / Funded \$25,000
  15. Zhang J, **Gauger P**, Harmon K, Yim-Im W, Main R. Refining PRRSV classification system and sequencing reports to better characterize genetic diversity and relatedness of PRRSV. American Association of Swine Veterinarians Foundation. July 1, 2018 – December 30, 2019.
    - Requested \$30,000 / Funded \$30,000
  16. Main R, **Gauger PC**, Harmon KM, Zhang J, Zimmerman JJ. SHIC -Negative cohort study plan for the estimation of diagnostic specificity of Two PCR assays for the detection of Classical Swine Fever, African Swine Fever and Foot and Mouth disease viruses in oral fluid samples. Swine Health Information Center and National Pork Board. November 15, 2017 – October 30, 2018.
    - Requested \$32,375 / Funded \$32,375
  17. Linhares D, Lopez W, Zimmerman JJ, Gimenez-Lirola L, Li G, **Gauger PC**. Evaluation, optimization, and application of "processing fluids" for PRRSV monitoring in commercial swine herds. National Pork Board. October 1, 2017 – September 30, 2018.
    - Requested \$95,520 / Funded \$95,520
  18. Co-PI: **Gauger PC**, Gimenez-Lirola L, Co-I: Park JY, Zhang J, Harmon K, Pineyro PE, Welch M. Development of immunoassays for Porcine Parainfluenza Type 1 (PPIV-1) antibody detection in serum and swine oral fluid specimens. Swine Health Information Center. November 1, 2017 – October 31, 2018.
    - Requested \$34,289 / Funded \$34,289
  19. Opriessnig T, **Gauger PC**, Halbur P, Karuppannan A, Moise L, De Groot A, Parrillo M. Evaluation of the epitope driven pDNA vaccine PigMatrix EDV in the pig model as a candidate vaccine for universal flu protection. Iowa Pork Producers Association. July 1, 2017 – June 30, 2018.
    - Requested \$25,000 / Funded \$25,000

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20. Zhang J, Schumacher L, Chen Q, **Gauger PC**, Gimenez-Lirola L, Magstadt D, Arruda P. Pathogenicity and antibody responses of different U.S. PEDV strains in pigs of different ages. Iowa Pork Producers Association. June 1, 2017 – May 31, 2018.
    - Requested \$108,087 / Funded \$108,087
  21. **Gauger PC**, Pineyro P, Zhang J. Validation of a porcine parainfluenza type-1 challenge model using a cell culture isolate and infectious clone in weaned pigs. Iowa Livestock Health Advisory Council.
    - Requested \$25,000 / Funded \$23,500
  22. Rumbelha W, **Gauger PC**. Evaluating the impact of low level hydrogen sulfide exposure on pathogenesis of zoonotic and endemic infectious swine diseases. National Pork Board.
    - Requested \$69,568 / Funded \$69,568
  23. **Gauger PC**, Harmon KM, Zhang J. Validation of a real-time reverse transcription PCR assay for detection of Porcine kobuvirus (PKV) in porcine diagnostic samples. Swine Health Information Center.
    - Requested \$24,954 / Funded \$24,954
  24. **Gauger PC**, Vincent AL, Halbur PA, Zhu Z, Friedberg I, Eulenstein O, Gabler N, Berg E. Development and integration of bioinformatics tools to characterize, monitor and rapidly recognize emerging influenza viruses in swine through data driven science. Iowa State University Presidential Initiative for Interdisciplinary Research
    - Requested \$137,000 / Funded \$125,000; 2016
  25. **Gauger PC**, Woodworth J, Jones C, Dritz SS, Main RG, Zhang J. Assessing PEDV infectivity of samples collected from a PEDV contaminated feed mill. National Pork Board
    - Requested \$54,509 / Funded \$54,509; 2016
  26. Harmon K, **Gauger PC**, Zhang J, Zimmerman J, Arruda PA, Matias-Ferreya F. Validation of a real-time reverse transcription PCR assay for detection of Porcine Sapelovirus. Swine Health Information Center.
    - Requested \$21,426 / Funded \$21,426; 2016
  27. Harmon K, **Gauger PC**, Zhang J, Zimmerman J, Arruda PA, Matias-Ferreya F. Validation of a real-time reverse transcription PCR assay for detection of Porcine Teschovirus. Swine Health Information Center.
    - Requested \$21,426 / Funded \$21,426; 2016
  28. Opriessnig T, **Gauger PC**, Halbur P, Tan M. Evaluation of two novel vaccine platforms targeting the IAV M2e epitope for a universal flu vaccine in the pig model. Iowa Livestock Health Advisory Council
    - Requested \$25,000 / Funded \$25,000; 2016
  29. Zhang J, **Gauger PC**, Harmon K. Development and evaluation of a real-time RT-PCR for the detection of Senecavirus A. Swine Health Information Center. 12/15/2016-12/14/2017. **\$27,333**.
    - Requested \$27,333 / Funded \$27,333; 2016

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30. **Gauger PC**, Vincent A, Rajao D, Anderson T, Abente E. Heterologous prime-boost vaccination protocols using whole inactivated influenza A virus vaccines to drive improved heterologous cross-protection. National Pork Board.
    - Requested \$78,420 / Funded \$78,420; 2016
  31. Vincent A, Rajao D, Abente E, Anderson T, **Gauger PC**. Adaptation of a human seasonal H3 influenza A virus to efficiently infect and replicate in the swine host. National Pork Board.
    - Requested \$41,742 / Funded \$41,742; 2016
  32. Main R, Rossow S, **Gauger P**, Harmon K, Marthaler D, Vannucci F, Zhang J. Expedited look into the prevalence of Senecavirus A in US Swine. Swine Health Information Center.
    - Requested \$50,000 / Funded \$50,000; 2015
    - Concept development, sample acquisition, designed testing strategies for sample types
  33. **Gauger PC**, Sato Y, Harmon KM, Zhang J, Wilberts B, Cardona C, Main R, Yoon KJ. Evaluation of alternative environmental samples matrices for avian influenza virus surveillance and stability in commercial poultry facilities. Iowa State University Egg Industry Center.
    - Requested \$43,168 / Funded \$43,168; 2015-2016
    - Lead author of grant, concept development, experimental design, designed testing strategies for sample types
  34. Sato Y, Yoon KJ, Zhang J, **Gauger PC**, Main R, Harmon KM, Beilke E, Canon A, Girgis G, Kelly J, Wilson D, Porter R. Evaluation of Feedstuffs for the Presence of Avian Influenza Virus (AIV) Collected from Feed Mills and Poultry Farms and their Role in Spreading of AIV. Iowa State University Egg Industry Center.
    - Requested \$45,297 / Funded \$45,297; 2015-2016
    - Experimental design, concept development, data collection
  35. Yoon KJ, Adelman JS, Sato Y, Blanchong J, **Gauger PC**, Zhang J, Li G, Main R, Beilke E, Canon A, Colboth E, Wisdom J. Role of Terrestrial Wild Birds, Rodents, and Insects in Spreading Avian Influenza Virus to Commercial Layer Operations. Iowa State University Egg Industry Center.
    - Requested \$119,866 / Funded \$119,866; 2015-2016
    - Diagnostic testing, data acquisition
  36. Rademacher C, Holtkamp D, Karriker L, **Gauger PC**. Efficacy of Zoetis PEDV vaccine in reducing clinical impact of PEDV on chronically affected breeding farm. Zoetis, LLC.
    - Requested \$59,078 / Funded \$59,078; 2015-2016
    - Experimental design, diagnostic testing, data collection
  37. Jones C, Stark C, Huss A, Main R, **Gauger PC**, Zhang J, Woodworth J, Dritz S, Tokach M. Evaluating alternative chemical mitigants to prevent PEDv recontamination of swine feed and ingredients. National Pork Board.
    - Requested \$77,119 / Funded \$77,119; 2014-2015
    - Supervise animal work, conduct testing, data collection
  38. Woodworth J, Stark C, Main R, Zhang J, Jones C, **Gauger PC**, Dritz S, Tokach M. Utilizing feed sequencing as a biosecurity intervention for preventing PEDV cross contamination in the feed manufacturing process. National Pork Board.
    - Requested \$99,800 / Funded \$99,800; 2014

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- Supervised animal work, conduct testing, data collection
39. Zhang J, Gimenez-Lirola LG, Zimmerman JJ, **Gauger PC**, Madson DM, Main R, Baum D. Generation of specimens of precisely known coronavirus infection status for the development and validation of highly-specific porcine coronavirus antibody assays. Iowa Pork Producers Association.
- Requested \$142,977 / Funded \$110,368; 2014 – 2015
  - Sample collection
40. \*Chen Q, Zhang J, Madson DM, **Gauger PC**. Evaluation of the pathogenesis differences of PEDV original and variant strains and examination of the cross-protective immunity between two strains. Iowa Pork Producers Association.
- Requested \$97,508 / Funded \$97,508; 2014 – 2015
  - Experimental design, histopathology/pathology, data collection, manuscript review
41. Zhang J, **Gauger PC**, Burrough E, Madson D, Gimenez-Lirola L, Yoon KJ. Effect of porcine epidemic diarrhea virus infectious doses on outcomes of infection in naïve neonatal piglets and weaned pigs. Iowa Pork Producers Association.
- Requested \$57,603 / Funded \$57,603; 2014 – 2015
  - Concept design and development, histopathology/pathology, data collection, manuscript review
42. **Gauger PC**, Magstadt D, Zhang J. Evaluation of Foster<sup>TM</sup> PRRSV serum neutralizing antibodies against contemporary lineage 1 PRRSV and challenge of conventional, naïve pigs with contemporary lineage 1 PRRSV / Evaluation of cross-protection in Foster<sup>TM</sup> PRRSV vaccinated conventional swine challenged with a contemporary, heterologous lineage 1 PRRSV. Zoetis LLC.
- Requested \$70,799 / Funded \$70,799; 2014
  - Lead author of grant, experimental design, conduct testing, histopathology/pathology, supervised animal work, data collection, data analysis, manuscript preparation
43. Dewell GA, Engelken T, **Gauger PC**, Phillips P. Surveillance of cull aged bulls for Trichomoniasis in IA sale barns. IA Veterinary Medical Association.
- Requested \$17,730 / Funded \$17,730; 2014 – 2015
  - Diagnostic testing, manuscript review
44. Gourapura R, **Gauger PC**, Zhang J. Evaluation of mucosal B cell response to PEDV in infected sows. National Pork Board.
- Requested \$81,442 / Funded \$81,442; 2014-2015
  - Concept development, sample collection, manuscript review
45. Zhang J, Chen Q, and **Gauger P**. *In vitro* evaluation of serological cross-reactivity and cross-neutralization between the PEDV original and variant strains. Zoetis, LLC.
- Requested \$17,661 / Funded \$17,661; 2014
  - Sample and data collection, manuscript review
46. Woodworth J, Stark C, Hesse R, Main R, Zhang J, Drits S, Tokach M, **Gauger PC**. Determining the impact of conditioning time and temperature in pelleted diets on PEDv survivability in complete swine diets. National Pork Board.
- Requested \$155,519 / Funded \$130,519; 2014
  - Supervised animal work, data collection



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47. Zhang J, **Gauger PC**, Harmon KM, Chen Qi. Evaluation of commercial rapid PED, TGE, and Rota Ag Test Kits for detecting virus pathogens in porcine feces. Zoetis LLC.
    - Requested \$24,590/ Funded \$24,590; 2013 – 2014
    - Sample collection, manuscript review
  48. Zhang J, **Gauger PC**, Li G, Main R. Development and evaluation of a live attenuated porcine epidemic diarrhea virus vaccine. Zoetis LLC.
    - Requested \$340,241/ Funded \$340,241; 2013 – 2015
    - Concept development and experimental design, histopathology/pathology, data collection, manuscript review
  49. Pillatzki AE, **Gauger PC**, Madson DM, Burrough ER, Zhang J, Magstadt D, Arruda PH, Yoon KJ, Stevenson GW. Feed Transmission of porcine epidemic diarrhea virus to neonatal piglets. American Association of Swine Veterinarians/National Pork Board.
    - Requested \$8,970/ Funded \$8,970; 2013 – 2014
    - Co-author of grant, concept development and experimental design, conduct testing, histopathology/pathology, supervised animal work, data collection, data analysis, manuscript preparation, manuscript review
  50. Madson DM, Stevenson GW, Yoon KJ, Arruda PH, Burrough ER, Cooper VL, **Gauger PC**, Harmon KM, Pillatzki AE, Schwartz KJ, Zhang J. Characterization of the pathogenesis of porcine epidemic diarrhea virus (PEDv) in neonates and weaned pigs and generation of reference diagnostic specimens. Iowa Pork Producers Association/National Pork Board; 2013.
    - Requested \$113,920/ Funded \$113,920; 2013 - 2014.
    - Data collection, manuscript review
  51. **Gauger PC**, Zhang J. Evaluation of Foster<sup>TM</sup> PRRSV vaccine protection against a contemporary PRRSV challenge and comparison of PRRSV shedding in vaccinated and non-vaccinated growing pigs. Zoetis LLC.
    - Requested \$162,488 / Funded \$162,488; 2013 – 2014
    - Lead author of grant, experimental design, conduct testing, histopathology/pathology, supervised animal work, data collection, data analysis, manuscript preparation, manuscript review
  52. Yoon KJ, Zhang J, Harmon K, **Gauger PC**, Johnson J, Schwartz KJ, Madson DM, Burrough E, Stevenson G. Porcine epidemic diarrhea (PED) disease: development of tests and reagents for diagnosis and disease management. Iowa Pork Producers Association.
    - Requested \$77,769/ Funded \$77,769; 2013 – 2014
    - Sample and data collection
  53. Balasuriya U, Cook RF, Zhang J, **Gauger PC**, Snijder E. Development of recombinant vaccines against porcine reproductive and respiratory syndrome (PRRS): equine arteritis virus-vectored chimeric vaccines against PRRSV. Merial Animal Health.
    - Requested \$362,109/ Funded \$362,109; 2013 – 2015
    - Concept development, data collection, testing strategies
  54. Tuggle CK, Dekkers JCM, Ross J, Cunnick J, Ellinwood NM, Wannemuehler MJ, **Gauger PC**. Characterization and utilization of a novel immune-compromised pig for biomedical modeling. Bailey Research Career Development Award. Iowa State University.
    - Requested \$50,000 / Funded \$50,000; 2012 – 2015

- Histopathology/pathology
55. **Gauger PC**, Vincent AL, Kitikoon P, Baker RB, Zhang J, Wang C. Detection and characterization of influenza A virus endemic circulation in neonatal and nursery pigs in a farm using routine influenza vaccination. Iowa Pork Producers Association.
    - Requested \$139,540 / Funded \$70,000; 2012 – 2013
    - Lead author of grant, experimental design, conduct testing, histopathology/pathology, supervised animal work, data collection, data analysis, manuscript preparation, manuscript review
  56. **Gauger PC**, Zhang J. Evaluation of modified live PRRSV 19S1.21 in late gestation swine from exposure to farrowing, Part 1. Pfizer Animal Health.
    - Requested \$120,883 / Funded 120,883; 2011 – 2012
    - Lead author of grant, experimental design, conduct testing, histopathology/pathology, supervised animal work, data collection, data analysis, manuscript preparation, manuscript review

#### **RESEARCH PROPOSALS OR GRANTS SUBMITTED**

1. **Gauger PC**, Ramirez A. CEIRR Excellence in Influenza Research. March 2020.
  - Requested \$1,379,233

#### **RESEARCH PROPOSALS OR GRANTS NOT FUNDED**

1. Zhang J, **Gauger PC**, Li G. Explore the unrecognized viruses potentially causing vesicular lesions in pigs. Swine Health Information Center. November, 2019.
  - Requested \$83,972
2. Harmon K, **Gauger PC**, Zhang J, Main R, Halbur P. Bolstering preparedness for an unprecedented animal health threat to Iowa animal agriculture. Carver Grant. November, 2019.
  - Requested \$236,000
3. Zhang J, **Gauger PC**, Li G. Explore the unrecognized viruses potentially causing vesicular lesions in pigs. USDA Capacity Seed Grants Program at ISU CVM. September, 2019.
  - Requested \$20,000
4. **Gauger PC**, Sharma A, Vincent AL, Anderson TK, Linhares D. Integration of a bioinformatics training program and web-based bioinformatics tools for veterinary students and swine veterinarians. Veterinary Services Grant Program Education Grants. Proposal 2019-04154. August, 2019.
  - Requested \$240,614
5. Yoon KJ, **Gauger PC**, Cho M. Broadening cross-protection against influenza A viruses in swine. Boehringer Ingelheim Award Advancing Research in Respiratory Disease. January 2019.
  - Requested \$35,000
6. Cho J, Yoon KJ, **Gauger PC**. Development of a universal influenza vaccine. PAR-16-366 Dual Purpose with Dual Benefit: Research in Biomedicine and Agriculture. March, 2019.
  - Requested \$2,453,115
7. Cho M, Yoon KJ, **Gauger P**. Dual Purpose with Dual Benefit: Research in Biomedicine and Agriculture Using Agriculturally Important Domestic Animal Species (R01). National Institutes of Health, United States Department of Agriculture. March, 2019.

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- Requested \$500,000.
8. Jones C, Niederwerder M, Woodworth J, Dritz S, **Gauger P**, Zhang J, Main R. Determination of the ability for Senecavirus A to be transmitted through feed, as well as its oral minimum infectious dose. National Pork Board. June 2018 – July 2019.
    - Requested \$69,199.
  9. Zhang J, Li G, **Gauger P**, Magstadt D, Harmon K. Can Sanger sequencing and next-generation sequencing technologies differentiate PRRSV vaccines from field strains when they are co-present in a single sample? Boehringer Ingelheim Award Advancing Research in Respiratory Disease. February 2018 – January 2019.
    - Requested \$35,000.
  10. Zhang J, Huang Y, **Gauger P**, Harmon K, Main R. Development and validation of real-time RT-PCR assays for the detection of swine acute diarrhea syndrome coronavirus (SADS-CoV) and investigation of its presence in US swine. Swine Health Information Center. July 2018 – June 2019.
    - Requested \$54,245.
  11. Zhang J, Li G, **Gauger PC**, Magstadt D, Harmon K. Can Sanger sequencing and next-generation sequencing technologies differentiate PRRSV vaccines from field strains when they are co-present in a single sample? Boehringer Ingelheim Vetmedica. 2017.
    - Requested \$35,000
  12. Zhang J, Chen Q, Schumacher L, **Gauger PC**, Li G, Main R. Characterization of porcine epidemic diarrhea virus after serial passages in cell culture. Iowa Pork Producers Association. 2017.
    - Requested \$59,938.
  13. **Gauger PC**, Vincent AL, Zhu Z, Berg E, Zhang J. Survey of swine industry personnel to evaluate best practices, perceptions, and biosecurity related to influenza A virus disease, control and transmission in swine. National Pork Board. 2017.
    - Requested \$58,801
  14. **Gauger PC**, Vincent AL, Zhu Z, Berg E, Zhang J. Survey of swine industry personnel to evaluate best practices, perceptions, and biosecurity related to influenza A virus disease, control and transmission in swine. Iowa Pork Producers Association. 2017.
    - Requested \$58,801
  15. Opriessnig T, **Gauger PC**, Halbur P, Tan M. Evaluation of a novel universal flu vaccine in the pig model. National Pork Board. 2017.
    - Requested \$87,932
  16. **Gauger PC**, Vincent AL, Zhu Z, Berg E, Zhang J. Survey of swine industry personnel to evaluate best practices, perceptions, and biosecurity related to influenza A virus disease, control and transmission in swine. National Pork Board. November, 2016.
    - Requested \$58,801
  17. Dennison D, Yoon KJ, Bindner H, **Gauger PC**, Natoli S. Use of Enterade® as supportive therapy for rotaviral diarrhea in pigs. USDA-NIFA-SBIR.
    - Requested \$99,937.00; 2016

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18. Linhares DC, **Gauger PC**, Levis I, Rademacher C. Developing an Influenza vaccination decision tree for breeding herds. National Pork Board.
    - Requested \$88,967; 2016
  19. Rumbelha W, **Gauger PC**. Evaluating the impact of low level hydrogen sulfide exposure on pathogenesis of zoonotic and endemic infectious swine diseases. National Pork Board.
    - Requested \$60,804; 2016
  20. Li G, **Gauger PC**, Sahin O, Krull A. Identification of Virulence Genes of Streptococcus suis through Large-scale Genome Sequencing. National Pork Board.
    - Requested \$74,730; 2016
  21. Opriessnig T, **Gauger PC**, Gerber P. Effect of gut health on influenza A virus (IAV) humoral immune response and vaccine efficacy. National Pork Board.
    - Requested \$66,000; 2016
  22. Baum DH, Gimenez-Lirola L, Rademacher C, Wang C, Zimmerman JJ, **Gauger PC**, Holtkamp D, Karriker L, Ramirez A. Description of Pathogen Ecology in Wean-To-Finish Commercial Swine Production. USDA-NIFA AFRI Animal Health & Disease
    - Requested \$499,690; 2015 – 2018
  23. **Gauger PC**, Gourapura R, Yoon KJ, Miller C, Zhang J, Madson DM, Zimmerman JJ. Vaccine Strategies And Platforms For Enhanced Mucosal Immunity Against Porcine Epidemic Diarrhea Virus. USDA-NIFA AFRI Animal Health & Disease
    - Requested \$500,000; 2015 – 2018
  24. Magstadt DM, **Gauger PC**, Madson DM, Burrough E, Zhang J, Zimmerman JJ. Comparison of cross-protection elicited by single dose vs. multiple dose (both sequential and rotational) PRRSV vaccine protocols against challenge with recently circulating, heterologous PRRSV field isolates. National Pork Board.
    - Requested \$59,385; 2015
  25. Li G, Zhang J, Yoon KJ, **Gauger PC**, Harmon KM, Sato Y, Main R. Molecular epidemiology of Highly Pathogenic Avian Influenza Viruses in Iowa toward Understanding of Area/Regional Spreading of the Virus. Iowa State University Egg Industry Center.
    - Requested \$49,622; 2015
  26. Halbur PG, **Gauger PC**, Vincent AL, Carriquiry A, Lasley P, Friedberg I. Development of computational tools and bioinformatics systems to characterize, monitor and control emerging and evolving viruses in swine through data driven science. Iowa State University Presidential Initiative for Interdisciplinary Research.
    - Requested \$542,508; 2015-2018
  27. **Gauger PC**, Vincent AL, Rajao D, Abente E. Regional serosurveillance of H1 and H3 swine cluster and human seasonal influenza A viruses circulating in United States swine. National Pork Board.
    - Requested \$49,900; 2014-2015
  28. Zhang J, Zimmerman JJ, Gimenez-Lirola L, **Gauger PC**, Burrough ER, Madson DM, Wang C, Main R. Evaluation of lactogenic immunity in pregnant swine induced by PEDV through different

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- routes of administration and the correlation with protective immunity in challenged piglets. National Pork Board.
- Requested \$149,269; 2014-2015
29. **Gauger PC**, Gourapura R, Yoon KJ, Miller C, Zhang J, Madson DM, Zimmerman JJ. Vaccine Strategies And Platforms For Enhanced Mucosal Immunity Against Porcine Epidemic Diarrhea Virus. USDA-NIFA AFRI Animal Health & Disease
- Requested \$500,000; 2014 - 2017
30. **Gauger PC**, Gourapura R, Zhang J, Madson DM, Magstadt D. Nanoparticle entrapped inactivated PEDV vaccine to induce maternal antibody mediated protection in neonatal and weaned piglets. National Pork Board.
- Requested \$98,876; 2014 – 2015
31. Chen Q, Zhang J, Madson DM, **Gauger PC**. Evaluation of the pathogenesis differences of PEDV original and variant strains and examination of the cross-protective immunity between two strains. National Pork Board.
- Requested \$90,356; 2014 - 2015
32. Zhang J, Burrough ER, **Gauger PC**, Madson DM, Gimenez-Lirola L, Yoon KJ. Determination of minimum infectious dose of porcine epidemic diarrhea virus in naïve neonatal piglets. IA Livestock Health Advisory Council Grant Program; 2014.
- Requested \$25,000; 2014 - 2015
33. **Gauger PC**, Zhang J, Burrough ER, Madson DM, Gimenez-Lirola L, Yoon KJ. Effect of porcine epidemic diarrhea virus infectious dose on outcomes of infection in naïve weaned piglets. IA Livestock Health Advisory Council Grant Program; 2014.
- Requested \$25,000; 2014 - 2015
34. Zhang J, Burrough ER, **Gauger PC**, Madson DM, Yoon KJ. Effects of porcine epidemic diarrhea virus infectious doses on outcomes of infection in naive neonatal piglets and weaned pigs. American Association of Swine Veterinarians Foundation; 2014.
- Requested \$30,000; 2014 – 2015
35. Zhang J, Yoon KJ, Harmon KM, **Gauger PC**, Stevenson G, Main R. Development and optimization of procedures for isolation and propagation of porcine epidemic diarrhea virus. National Pork Board.
- Requested \$17,200; 2013 - 2014
36. Zhang J, Yoon KJ, Harmon KM, **Gauger PC**, Stevenson G, Main R. Molecular epidemiology of porcine epidemic diarrhea virus circulating in US swine. National Pork Board.
- Requested \$61,800; 2013 - 2014
37. Zhang J, **Gauger PC**, Balasuriya U. Application of equine and porcine chimeric arteriviruses to determine the porcine reproductive and respiratory syndrome virus proteins responsible for the host range and induction of protective immunity. National Pork Board.
- Requested \$107,616; 2013 - 2014

38. Sandbulte M, **Gauger PC**, Roth J, Platt R, Zhang J. Live and inactivated swine influenza vaccines as prophylaxis against the natural transmission of contemporary H3N2 strains. National Pork Board.
  - Requested \$75,000; 2013 - 2014
39. Harmon KM, **Gauger PC**, Zhang J, Pillatzki A, Yoon KJ, Zimmerman JJ, Stevenson G, Main R. Evaluation of performance of 4 different PCR tests for detection of PEDv in feces and oral fluids and evaluation effect of freeze/thaw cycle on testing repeatability. National Pork Board.
  - Requested \$50,000; 2013-2014
40. Zhang J, **Gauger PC**, Balasuriya UBR. Evaluation of replication, immunogenicity and protection efficacy of EAV-PRRSV chimeric viruses expressing GP5 and/or M ectodomains of PRRSV in pigs. IA Pork Producers Association.
  - Requested \$57,000; 2013 – 2014
41. Zhang J, **Gauger PC**, Balasuriya UBR. Evaluation of replication, immunogenicity and protection efficacy of EAV-PRRSV chimeric viruses expressing GP5 and/or M ectodomains of PRRSV in pigs. IA Livestock Health Advisory Council Grant Program.
  - Requested \$25,000; 2013 – 2014
42. Gourapura R, **Gauger PC**, Zhang J. Validation of swine oral fluid-based PRRS virus neutralization assay: a potential diagnostic tool to monitor protective PRRS herd immunity. National Pork Board.
  - Requested \$75,000; 2013-2014
43. **Gauger PC**, Vincent AL, Kitikoon P, Zhang J, Wang C, Baker RB. Detection and characterization of influenza A virus endemic circulation in neonatal and nursery pigs in a farm using routine influenza vaccination. National Pork Board.
  - Requested \$139,540; 2011 - 2012

#### AD HOC REVIEWER – REFEREED JOURNALS

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|------|--|
| 2020 | <i>Journal of Swine Health and Production</i> : Lead Reviewer<br>Full-length scientific manuscript (1) <i>M. hyopneumoniae</i> ; (1) Complete Blood Count  |
| 2019 | <i>Journal of Swine Health and Production</i> : Lead Reviewer<br>Full-length scientific manuscript (1) <i>Salmonella</i> ; (1) Porcine Lung Lesion Evaluation<br><i>Vaccine</i><br>Full-length scientific manuscript (1) Influenza A virus   |
| 2018 | <i>Veterinary Microbiology</i><br>Full-length scientific manuscript (1) Influenza A virus<br><i>Journal of Swine Health and Production</i> : Lead reviewer<br>Full-length scientific manuscript (1) <i>M. hyopneumoniae</i> ; (1) Parasites; (1) PRRSV; (1) <i>Salmonella</i>              |
| 2017 | <i>Journal of Swine Health and Production</i> : Lead Reviewer<br>Full-length scientific manuscript (1) PEDV; (1) <i>M. hyopneumoniae</i> ; (2) <i>E. coli</i> ; (2) PRRSV  |
| 2016 | <i>PLoS One</i><br>Full-length scientific manuscript (1) H1N1 invariant NKT cell ligand<br><i>Veterinary Microbiology</i><br>Full-length scientific manuscript (2) IAV and APP, Influenza D<br><i>Journal of Swine Health and Production</i><br>Full-length scientific manuscript (1) PEDV |

- 2015 *Future Virology*  
Full-length scientific manuscript (1) IAV  
*Virology Journal*  
Full-length scientific manuscript (1) Pandemic H1N1  
*Toxicologic Pathology*  
Full-length scientific manuscript (1) IHC/Porcine markers  
*Ciencia Rural*  
Full-length scientific manuscript (1) BVDV  
*Virology Journal*  
Review manuscript (1) PEDV  
*Veterinary Science*  
Full-length scientific manuscript (1) PEDV  
*PLoS One*  
Full-length scientific manuscript (2) Influenza  
2011, 2014 *Journal of Swine Health and Production*  
Full-length scientific manuscript (2) PCV2, IAV-S  
2013, 2014 *PLoS One*  
Full-length scientific manuscript (2) IAV-S, PRRSV  
2014 *Veterinary Microbiology*  
Full-length scientific manuscript (2) PRRSV, High Path AIV  
2013 *Veterinary Pathology*  
Full-length scientific manuscript (1) PCV2

**AD HOC REVIEWER – GRANTS**

- 2018 National Pork Board Grants Program.
- 2015 Iowa Livestock Health Advisory Council (ILHAC): Iowa State University.
- 2014 Ohio Agricultural Research and Development Center (OARDC), SEEDS: OARDC Research Enhancement Competitive Grants Program, Ohio State University.
- 2009 – 2010 National Pork Board Grants Program.

**SPECIAL PROJECTS/FEE FOR SERVICE**

1. **Gauger PC**, Welch M, Carlson J. Testing the Effects of Defusion on PEDv in Cell Culture. Provimi North America, Inc.
  - \$1,500; 2015
  - Initiated collaboration, concept development and design, coordinate and conduct laboratory testing
2. **Gauger PC**, Zhang J, Harmon KM. Boehringer Ingelheim Fellowship in Veterinary Diagnostic and Production Animal Medicine with emphasis on the diagnosis and control of viral diseases of swine. Boehringer Ingelheim Vetmedica, Inc.
  - \$100,000; 2015 – 2017
  - Establish fellowship with BIVI, supervise post-doctoral position, concept and development of swine viral disease research and diagnostic testing, novel virus investigation
3. **Gauger PC**, Derscheid R, Madson DM, Arruda P. Zoetis Fostera PRRSV management of sample selection and necropsy. Zoetis.
  - \$4,000; 2015

- Coordinated and managed the necropsy for Zoetis PRRSV research trial
4. **Gauger PC**, Zhang J, Burrough E, Baker RB. Evaluation of mortality in PEDV challenged piglets administered Enterade oral rehydration product. Entrinsic Health Solutions LLC.
    - \$23,794; 2015
    - Concept development and experimental design of research to evaluate the effectiveness of Enterade® in PEDV-challenged piglets (glucose diet), managed piglet experiment, managed laboratory staff
  4. **Gauger PC**, Zhang J, Burrough E, Baker RB. Evaluation of Enterade oral rehydration product for PEDV in neonatal, weaned piglets: proof of concept. Entrinsic Health Solutions LLC.
    - \$11,000; 2014
    - Established collaboration with Entrinsic health solutions, concept development and experimental design of research to evaluate the effectiveness of Enterade® in PEDV-challenged piglets (non-glucose diet), manage piglet experiment, manage laboratory staff
  6. **Gauger PC**, Welch M. Nanosterosol sanitizer effect of PEDV in cell culture. Nano Nano, LLC.
    - \$6,000; 2014
    - Concept development and experimental design, manage and conduct testing, data collection and analysis, virus isolation
  7. **Gauger PC**, Welch M. Effect of Fucoidan on PEDV in cell culture. Marinova Pty Ltd.
    - \$1,220; 2014
    - Concept development and experimental design, manage and conduct testing, data collection and analysis, virus isolation

**SPECIAL PROJECTS/ISU VDL**

	<b>Year</b>	<b>Project</b>	<b>Client</b>	<b>Responsibility</b>	<b>Amount</b>
20.	2015	PEDV	Vet Resources, Inc.	Histopathology /lesion score	\$1,446
19.	2015	Draxxin	Zoetis	Gross & histopathology evaluation	\$948
18.	2015	Slaughter Check	Boehringer-Ingelheim	Histopathology /lesion score	\$2,759
17.	2015	PEDV	Vet Resources, Inc.	Histopathology /lesion score	\$1,792
16.	2015	PEDV	Merck	Histopathology /lesion score	\$955
15.	2014	PEDV	Merck	Histopathology /lesion score	\$446
14.	2014	PEDV	Vet Resources, Inc.	Histopathology /lesion score	\$1,139
13.	2014	PEDV	Vet Resources, Inc.	Histopathology /lesion score	\$3,860
12.	2014	M. hyopneumoniae	Vet Resources, Inc.	Histopathology /lesion score	\$76
11.	2014	M. hyopneumoniae	Vet Resources, Inc.	Histopathology /lesion score	\$35
10.	2014	M. hyopneumoniae	Vet Resources, Inc.	Histopathology /lesion score	\$45
9.	2014	Injection Site	Merck	Histopathology /lesion score	\$392
8.	2014	PRRSV	Murphy Brown	PRRSV virus neutralization assay	\$919
7.	2014	Injection Site	Merck	Histopathology /lesion score	\$1,040
6.	2013	PEDV	Midwest Veterinary	Histopathology /lesion score	\$1,319
5.	2013	M. hyopneumoniae	Zoetis	Histopathology evaluation	\$1,678
4.	2013	Influenza	Vet Resources, Inc.	Histopathology /lesion score	\$7,952
3.	2013	Influenza	University of Kentucky	Histopathology /lesion score	\$283



2.	2012	M. hyop/PCV	Pfizer, Inc.	Histopathology /lesion score	\$2,898
1.	2012	PRRSV	Pfizer, Inc.	Histopathology /lesion score	\$6,493
<b>Total</b>					<b>\$36,476</b>

#### NEWS ARTICLES / INTERVIEWS / IMPACT

- **Gauger PC.** Vaccination top tool to manage IAV-S. Swine Practitioner supplement to Pork Magazine. July-August 2019. P. 3.
- **Gauger PC.** Session Monitor: Virology 1. 60<sup>th</sup> American Association of Veterinary Laboratory Diagnosticians. Saturday, October 14, 2017. San Diego, CA. p. 115.
- **Gauger PC.** Influenza: A growing threat to your herd's potential. Influenza advertorial sponsored by Boehringer Ingelheim Vetmedica. National Hog Farmer, Feedstuffs, Iowa Spokesman, Minnesota Farm Guide and Illinois Agri-News. August – December, 2017.
- Mullen C, Bradner L, Matias-Ferreya F, Huang H, **Gauger PC**, Zhang J, Zimmerman JJ, Arruda P, Harmon KM. Validating detection methods for porcine teschovirus and porcine sapelovirus using qPCR and nested RT-PCR. Iowa State University College of Veterinary Medicine Summer Scholars Program. May – August, 2017.
- **Gauger PC.** Understanding swine flu's diversity key to better control programs. Pig Health Today Podcast. February, 2017.
- Partnership aims to improve PRRSV virus isolation. *Feedstuffs*. December 15, 2016.
  - [http://www.feedstuffs.com/newsletter-nutrition-health-news/partnership-aims-improve-prrs-virus-isolation?NL=FP-006&Issue=FP-006\\_20161215\\_FP-006\\_365&sfvc4enews=42&cl=article\\_4\\_1&utm\\_rid=CPG02000000646050&utm\\_campaign=12963&utm\\_medium=email&elq2=003fa13da0004ae3a77a959552bcd7a8](http://www.feedstuffs.com/newsletter-nutrition-health-news/partnership-aims-improve-prrs-virus-isolation?NL=FP-006&Issue=FP-006_20161215_FP-006_365&sfvc4enews=42&cl=article_4_1&utm_rid=CPG02000000646050&utm_campaign=12963&utm_medium=email&elq2=003fa13da0004ae3a77a959552bcd7a8).
- Presidential research initiative promotes big thinking in data-driven science. September 8, 2016.
  - <http://www.inside.iastate.edu/article/2016/09/08/research>
- Deadly pig virus remains a mystery – and a threat. December 14, 2015.
  - <http://www.tinyurl.com/p6png9t>
- Live attenuated influenza vaccines may have advantages for use in swine, according to IA State University research. *IA State University New Service*. January 16, 2015.
 

Distribution:

  - National Hog Farmer. <http://nationalhogfarmer.com/animal-well-being/intranasal-live-attenuated-influenza-vaccines-show-advantages-swine>.
  - Phys.Org. <http://phys.org/news/2015-01-attenuated-influenza-vaccines-advantages-swine.html>.
  - MyInforms.com. <http://myinforms.com/en-us/a/9810527-live-attenuated-influenza-vaccines-may-have-advantages-for-use-in-swine/>.
  - Farmstead media group; <https://www.spreaker.com/user/foodandfarm/phillip-gauger-swine-flu-vaccines>
  - Ames Tribune; <http://amestrib.com/news/isu-researcher-studying-potential-influenza-vaccine-swine>

- Researchers identify new swine flu strain. National Hog Farmer. January 15, 2008.  
[http://nationalhogfarmer.com/health-diseases/scientists\\_discover\\_flu\\_strain](http://nationalhogfarmer.com/health-diseases/scientists_discover_flu_strain).

**INSTITUTIONAL SERVICE****College**

- 2017-Present Institutional Biosafety Committee, Iowa State University.
- 2012-Present Section Leader: Molecular, Virology, Health Assurance Testing Section, Iowa State University College of Veterinary Medicine, Veterinary Diagnostic Laboratory.
- 2015 Search Committee: Director II, Professional and Scientific (Laboratory Animal Resources Director).

**Department**

- 2018-Present VDPAM Research and Graduate Studies Committee.
- 2015 Search Committee Chair: Clinician, Senior Clinician, Assistant, Associate, or Full Professor (Bacteriology Section Leader).
- 2014 Search Committee: Clinician, Senior Clinician, Assistant, Associate, or Full Professor (Serology Section Leader).
- 2014-2017 Strategic Planning Committee: Iowa State University Veterinary Diagnostic Laboratory.
- 2014 Peer Review Committee: Senior Clinician Promotion.
- 2013 Search Committee: Adjunct Instructor.
- 2013 Search Committee: Clinician, Senior Clinician, Assistant, Associate, or Full Professor (Diagnostic Pathologist).
- 2012 Search Committee: Clinical Microbiology Residency.



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