KARL KERNS
CURRICULUM VITAE

DEGREES HELD

2014 – 2019:	Ph.D.	University of Missouri-Columbia, Columbia, Missouri. Animal Science, Reproductive Physiology
2010 – 2014:	B.S.	Iowa State University, Ames, Iowa. Animal Science with Honors

SUMMARY OF PROFESSIONAL EXPERIENCE

2021 – Present	Assistant Professor, Department of Animal Science, Iowa State University Appointment: 65% Research; 30% Teaching; 5% Service
2020 – 2021	Lecturer, Department of Animal Science, Iowa State University Appointment: 75% Teaching; 25% Research
2019 – 2020	USDA NIFA Postdoctoral Fellow, Division of Animal Sciences & Department of Electrical Engineering & Computer Science, University of Missouri-Columbia
2017 – 2019	USDA NIFA Predoctoral Fellow, Division of Animal Sciences, University of Missouri-Columbia
2014 – 2017	Miller Fellow, Division of Animal Sciences, University of Missouri-Columbia
Summer 2013	Intern, Dr. David Guthrie Lab, USDA ARS Beltsville
Summer 2011	Sexed Semen and In-vitro Fertilization Lab Intern, Trans Ova Genetics
Summer 2012	Management & Operations Intern, Smithfield Premium Genetics (NC & TX)

ISU PERSONNEL RECORD

Assistant Professor, May 2021 – present: B-base (9 month appointment), 65% research, 30% teaching, 5% service
- Primary Affiliation: Department of Animal Science (AnS)
- Graduate Faculty Memberships:
  - Physiology Faculty Group (AnS; 2020)
  - Interdepartmental Genetics & Genomics (IGG; 2021)
  - Bioinformatics & Computational Biology (BCB; 2021)
  - Toxicology (TOX; 2024)

Lecturer, August 2020 – May 2021: B-base (9 month appointment), 75% teaching, 25% research
- Primary Affiliation: Department of Animal Science (AnS)
- Graduate Faculty Memberships:
  - Physiology Faculty Group (AnS; 2020)

SCHOLARSHIP

Publications and Research Presentations

Key:

*indicates corresponding author.
[1]indicates graduate student in my lab.
[2]indicates post-doc in my lab.
[3]indicates undergraduate in my lab.
[4]indicates visiting scholar in my lab.
[#]indicates authors contributed equally to this work.

Summary:

Total Papers – 33
H Index – 14
The largest number of publications h such that h publications have at least h citations.
I-10 Index –16
The total number of publications with at least 10 citations
Total Citations – 775
(*Source: Google Scholar 01 Oct 2024*)

Peer-Reviewed Publications prior to appointment at Iowa State University

1. **Kerns K**, Morales P, Sutovsky P. 2016. Regulation of Sperm Capacitation by the 26S proteasome: An emerging New Paradigm in Spermatology. ***Biol Reprod*** 94(5):117. DOI: 10.1095/biolreprod.115.136622

2. Chinchilla-Vargas J, **Kerns K**, Rothschild MF. 2017. Climatic and lunar effects on boar semen traits. ***Anim Reprod Sci***. DOI:10.1016/j.anireprosci.2018.04.006

3. **Kerns K**, Zigo M, Sutovsky P. 2018. Zinc: A Necessary Ion for Mammalian Sperm Fertilization Competency. ***Int. J. Mol. Sci***. 19 (12), 4097. DOI:10.3390/ijms19124097

4. **Kerns K**, Zigo M, Sutovsky M, Drobnis E, Sutovsky P. 2018. Zinc Ion Flux of Mammalian Spermatozoa Capacitation. ***Nature Communications***. DOI:10.1038/s41467-018-04523-y

5. Zigo M, **Kerns K**, Sutovsky M, Sutovsky P. 2018. Modifications of the 26S proteasome during boar sperm capacitation. ***Cell Tissue Res***. DOI:10.1007/s00441-017-2786-6

6. Zigo M, Manaskova-Postlerova P, Jonakova V, **Kerns K**, Sutovsky P. 2019. Ubiquitin-proteasome system participates in the de-aggregation of spermadhesion and DQH protein during boar sperm capacitation. ***Reprod***. DOI: 10.1530/REP-18-0413

7. Sutovsky P, **Kerns K**, Zigo M, Zuidema D. 2019. Boar Semen Improvement through Sperm Capacitation Management, With Emphasis on Zinc Ion Homeostasis. ***Theriogenology***. DOI: 10.1016/j.theriogenology.2019.05.037

8. Mordhorst BR, **Kerns KC**, Schauflinger M, Murphy SL, Ross RM, Samuel MS, Wells KD, Green JA, Sutovsky P, Prather RS. 2019. Pharmacologic reprogramming designed to induce a Warburg Effect in porcine fetal fibroblasts decreases mitochondrial membrane potential and increases the quantity of autolysosomes, without impacting the overall quantity or size mitochondria. ***Scientific Reports***. DOI:10.1038/s41598-019-45850-4

9. Zigo M, Manaskova-Postlerova P, Jonakova V, **Kerns K**, Sutovsky P. 2019. Compartmentalization of the proteasome-interacting proteins during sperm capacitation. ***Scientific Reports***. DOI:10.1038/s41598-019-49024-0

10. Kelsey KM, Zigo M, Thompson WE, **Kerns K**, Manandhar G, Sutovsky M, Sutovsky P. 2020. Reciprocal Surface Expression of Arylsulfatase A and Ubiquitin in Normal and Defective Mammalian Spermatozoa. ***Cell Tissue Res***. 379, 561-576. DOI: 10.1007/s00441-019-03144-1

11. Zigo M, Maňásková-Postlerová P, Zuidema D, **Kerns K**, Jonáková V, Tůmová L, Bubeníčková F, Sutovsky P. 2020. Porcine model for the study of sperm capacitation, fertilization, and male fertility. ***Cell Tissue Res***. 380(2):237-262. DOI: 10.1007/s00441-020-03181-1.

12. **Kerns K**, Sharif M, Zigo M, Xu W, Hamilton LE, Sutovsky M, Ellersieck M, Drobnis EZ, Bovin N, Oko R, Miller D, Sutovsky P. 2020. Sperm Cohort-Specific Zinc Signature Acquisition and Capacitation-Induced Zinc Flux Regulate Sperm-Oviduct and Sperm-Zona Pellucida Interactions. ***Int. J. Mol. Sci.*** 21(6), 2121; DOI: 10.3390/ijms21062121

<u>Peer-Reviewed Publications since appointment at Iowa State University</u>

13. **Kerns K**, Jankovitz J, Robinson J, Minton A, Kuster C, Sutovsky P. 2020. Relationship between the length of sperm tail mitochondrial sheath and fertility traits in boars used for artificial insemination. ***Antioxidants.*** 9(11), 1033, DOI:10.3390/antiox9111033

14. Momal S, **Kerns K**, Sutovsky P, Bovin N, Miller D. 2021. Progesterone Induces Porcine Sperm Release from Oviduct Glycans in a Proteasome-dependent Manner. ***Reproduction***. DOI:10.1530/REP-20-0474

Peer-Reviewed Publications since tenure-track appointment at Iowa State University

15. Chen P, Redel B, **Kerns K**, Spate L, Prather R. 2021. Challenges and Considerations during In Vitro Production of Porcine Embryos. ***Cells***. DOI:10.3390/cells10102770

16. Zuidema D, **Kerns K**, Sutovsky P. 2021. An Exploration of Current and Perspective Semen Analysis and Sperm Selection for Livestock Artificial Insemination. ***Animals***. DOI: 10.3390/ani11123563

17. Nogueira E, Tirpák F, Hamilton L, Zigo M, **Kerns K**, Sutovsky M, Kim J, Volkmann D, Jovine L, Taylor J, Schnabel R, Sutovsky P. 2022. A Non-Synonymous Point Mutation in a WD-40 Domain Repeat of EML5 Leads to Decreased Bovine Sperm Quality and Fertility. ***Front. Cell Dev. Biol.*** DOI: 10.3389/fcell.2022.872740

18. Ortega MS, Rizo J, Drum J, O'Neil E, Pohler K, **Kerns K**, Schmelze A, Green J, Spencer T. 2022. Development of an Improved in vitro Model of Bovine Trophectoderm Differentiation. Front. Anim. Sci**.** DOI: 10.3389/fanim.2022.898808

19. Sharif M, Hickl V, Juarez G, Di X, **Kerns K**, Sutovsky P, Bovin N, Miller DJ. 2022. Hyperactivation is sufficient to release porcine sperm from immobilized oviduct glycans. ***Sci. Rep.*** DOI: 10.1038/s41598-022-10390-x

20. Zigo M, **Kerns K**, Sen S, Essien C, Oko R, Xu D, Sutovsky P. 2022. Zinc is a master-regulator of sperm function associated with binding, motility, and metabolic modulation during porcine sperm capacitation. Commun. Biol. DOI: 10.1038/s42003-022-03485-8

21. Lawlor M, Zigo M, **Kerns K**, Cho IK, Easley CA, Sutovsky P. 2022. Spermatozoan Metabolism as a Non-Traditional Model for the Study of Huntington's Disease. Intl J of Molc Sci. DOI: 10.3390/ijms23137163

22. Spooner-Harris M, **Kerns K,** Zigo M, Sutovsky P, Balboula A, Patterson A. 2022. A re-appraisal of mesenchymal-epithelial transition (MET) in endometrial epithelial remodeling. Cell Tissue Res. DOI: 10.1007/s00441-022-03711-z

23. Rishi JK, Timme K, White HE, **Kerns KC**, Keating AF. 2023. Obesity partially potentiates dimethylbenz[a]anthracene-exposed ovotoxicity by altering the DNA damage repair response in mice. Biol. Reprod. DOI: 10.1093/biolre/ioac218

24. Zigo M, **Kerns K**, Sutovsky P. 2023. The Ubiquitin-Proteasome System Participates in Sperm Surface Subproteome Remodeling during Boar Sperm Capacitation. Biomolecules. 2023 Jun 15;13(6):996. DOI: 10.3390/biom13060996

25. Zoca SM, Geary TW, Zezeski AL, **Kerns K**, Dalton JC, Harstine BR, Utt MD, Cushman RA, Walker JA, Perry GA. 2023. Bull field fertility differences can be estimated with in vitro sperm capacitation and flow cytometry. Front. Anim. Sci. 2023 May 2;4. DOI: 10.3389/fanim.2023.1180975

26. Silva CS, da Costa-e-Silva EV, Dode MAN, Cunha ATM, Garcia WR, Sampaio BFB, Silva JCB, Vaz FEM, **Kerns K**, Sutovsky P, Nogueira E. 2023. Semen quality of Nellore and Angus bulls classified by fertility indices and relations with field fertility in fixed-time artificial insemination. Theriogenology. 2023 Dec;212:148-156. DOI: 10.1016/j.theriogenology.2023.09.001

27. Rishi JK, Timme K, White HE, **Kerns KC**, Keating AF. 2024. Altered histone abundance as a mode of ovotoxicity during 7,12-dimethylbenz[a]anthracene exposure with additive influence of obesity. Biol. Reprod. DOI: 10.1093/biolre/ioad140

28. Rishi JK, Timme K, White HE, **Kerns KC**, Keating AF. 2024. Trajectory of primordial follicle depletion is accelerated in obese mice in response to 7, 12-dimethylbenz [a] anthracene exposure. Biol. Reprod. DOI: 10.1093/biolre/ioae059

29. Keller A[1], **Kerns K***. 2023. Sperm Capacitation as a Predictor of Boar Fertility. Mol. Reprod. Dev. DOI:10.1002/mrd.23690. (approximate percentage contribution – 100%) *Karl Kerns developed the outline, edited the manuscript, led and supervised our response to reviewers' comments, and served as senior author. Dr. Kerns also supervised and guided his graduate student in data collection, interpretation, and writing.*

30. Weide T[1], Mills K, Shofner I[1], Breitzman MW, **Kerns K***. 2024. Metabolic Shift in Porcine Spermatozoa during Sperm Capacitation-induced Zinc Flux. Intl. J. of Molc. Sci. DOI: 10.3390/ijms25147919

31. Sutovsky P, Hamilton LE, Zigo M, Ortiz D'Avila Assumpção ME, Jones A, Tirpak F, Agca Y, **Kerns K**, Sutovsky M. 2024. Biomarker-based human and animal sperm phenotyping: the good, the bad and the ugly. Biol. Reprod. DOI: 10.1093/biolre/ioae061.

32. Weide T[a], Mills K, Shofner I[a], Breitzman MW, **Kerns K***. 2024. Metabolic Shift in Porcine Spermatozoa during Sperm Capacitation-induced Zinc Flux. Intl. J. of Molc. Sci. DOI: 10.3390/ijms25147919.

33. Else-Keller A[a], Maus M[b], Keller E[b], Kerns K*. 2024. Deep Learning Classification Method for Boar Sperm Morphology Analysis. J. Androl. DOI:10.1111/andr.13758.

Abstracts prior to appointment at Iowa State University

1. Localization of Candidate Proteasomal Interactors ADAM5 and NEDL2 in Porcine Spermatozoa. **Karl Kerns**, Michal Zigo, Miriam Sutovsky, Peter Sutovsky. Society for the Study of Reproduction Annual Meeting, San Juan, PR *(2015)*

2. Capacitation-induced Changes of Candidate Proteasomal Interactors ADAM5 and NEDL2, Measured by Image-based Flow Cytometry in Porcine Spermatozoa. **Karl Kerns**, Miriam Sutovsky, Peter Sutovsky. Society for the Study of Reproduction Annual Meeting, San Diego, CA *(2016)*

3. Proteasomal Activity is Necessary for Porcine Sperm Release from Immobilized Oviduct Glycans. Momal Sharif, **Karl Kerns**, Peter Sutovsky, David Miller. Society for the Study of Reproduction Annual Meeting, Washington, DC *(2017)*

4. New Insights into the Involvement of Ubiquitin-Proteasome System (UPS) in Boar Sperm Capacitation. Michal Zigo, **Karl Kerns**, Miriam Sutovsky, Peter Sutovsky. Society for the Study of Reproduction Annual Meeting, Washington, DC *(2017)*

5. Ubiquitin-Proteasome System (UPS) Regulates Spermadhesin Release During Boar Sperm Capacitation. Michal Zigo, Pavla Postlerova, Vera Jonakova, **Karl Kerns**, Peter Sutovsky. Society for the Study of Reproduction Annual Meeting, New Orleans, LA *(2018)*

6. Mammalian Sperm Zinc Ion Fluctuations from Spermiogenesis to Fertilization. **Karl Kerns**, Michal Zigo, Peter Sutovsky. Society for the Study of Reproduction Annual Meeting, New Orleans, LA *(2018)*

7. Identification of Seminal Parameters Predictive of Conception Rates in Bos Indicus Cows Submitted to Timed-Artificial Insemination. E Nogueira, C Sanches, EV COSTA E SILVA, A Mendes, MAN Dode, G Wiley, K Kerns, P Sutovsky. 32nd Annual Meeting of the Brazilian Embryo Technology Society (*2018)*

8. Boar Sperm Zinc Ion Fluctuations from Spermiogenesis to Fertilization. **Karl Kerns**, Michal Zigo, Peter Sutovsky. Biennial Conference of the Association for Applied Animal Andrology, New Orleans, LA *(2018)*

9. A(xoneme) to Z(inc): New Paradigm for Mammalian Sperm Fertilization Competency. **Karl Kerns**, Michal Zigo, Wei Xu, Erma Drobnis, Lauren Hamilton, Miriam Sutovsky, Richard Oko, Peter Sutovsky. Yanagmachi 90th Birthday Symposium, Honolulu, HI *(2018)*

10. Sire Influences Gene Expression in Trophoblast Cell Markers In Vitro. M. Sofia Ortega, **Karl Kerns**, Thomas E. Spencer. Society for the Study of Reproduction Annual Meeting, San Jose, CA *(2019)*

11. Identification of a Rare, Fertility Affecting Mutation in Bovine Eml5. Michal Zigo, Eriklis Nogueira, **Karl Kerns**, Miriam Sutovsky, Jaewoo Kim, Filip Tirpak, Thomas E. Spencer, Jeremy F. Taylor, Robert D. Schnabel, Peter Sutovsky. Society for the Study of Reproduction Annual Meeting, San Jose, CA *(2019)*

12. Impact of High Fat Diet-Induced Obesity on Ovarian Chemical Metabolism Proteins in Rats. María E. González Alvarez, Bailey C. Mcguire, **Karl Kerns**, Peter Sutovsky, Aileen F. Keating. Society for the Study of Reproduction Annual Meeting, San Jose, CA *(2019)*

13. Impact of High Fat Diet-Induced Obesity on Ovarian DNA Damage Repair Proteins In Rats. Bailey C. McGuire, María E. González Alvarez, **Karl Kerns**, Peter Sutovsky, Aileen F. Keating. Society for the Study of Reproduction Annual Meeting, San Jose, CA *(2019)*

14. Sperm Tail Mitochondrial Sheath Length Correlates with Bull Fertility Outcomes. Grace Wiley, Eriklis Nogueira, Camile Sanches, **Karl Kerns**, Peter Sutovsky. Society for the Study of Reproduction Annual Meeting, San Jose, CA *(2019)*

15. Zinc Interacting Profile Changes During In Vitro Capacitation of Boar Spermatozoa. Zigo M, **Kerns K**, Sen S, Essien C, Xu D, Sutovsky P. Society for the Study of Reproduction Annual Meeting. Virtual due to COVID *(2020)*

16. Artificial Intelligence Analysis of the Mammalian Sperm Zinc Signature Predicts Male-factor Subfertility. **Kerns K**, Kramer S, Zigo M, Minton A, Xu D, Behura S, Sutovsky P. Society for the Study of Reproduction Annual Meeting. Virtual due to COVID *(2020)*

<u>Abstracts since appointment at Iowa State University</u>

17. Zoca S, Geary T, Zezeski A, **Kerns K**, Dalton J, Harstine B, Utt M, Cushman R, Walker J, Perry G*. Bull Field Fertility Differences can be Estimated with In Vitro Sperm Capacitation and Flow Cytometry. Society for the Study of Reproduction. St. Louis, MO *(2021)*

18. Zuidema D, **Kerns K**, Zigo M, Hamilton L, Sutovsky P*. An Exploration of Semen Analysis and Sperm Selection for Livestock Artificial Insemination**.** National Association of Animal Breeders. Online due to COVID-19 *(2021)*

19. Sutovsky P*, Zuidema D, **Kerns K**, Zigo M, Hamilton L, Sutovsky M. Male Infertility and Semen Evaluation: Andrology in the Age of Precision Medicine and Agriculture. Arnold Theiler Memorial, University of Pretoria, South Africa *(2021)*

20. Hamilton L, Nogueira E, Tirpak F, Zigo M, **Kerns K**, Sutovsky M, Kim J, Volkmann D, Jovine L, Taylor J, Schnabel R, Sutovsky P*. A deleterious Single Nucleotide Polymorphism in the TAPE domain of EML5 is associated with decreased fertility in Angus bulls. Society for the Study of Reproduction. St. Louis, MO *(2021)*

21. Spooner M, **Kerns K**, Zigo M, Sutovsky P, Patterson A*. A Reappraisal of Mesenchymal-Epithelial Transition in Endometrial Epithelialization. Society for the Study of Reproduction. St. Louis, MO *(2021)*

22. Zigo M, **Kerns K**, Sutovsky P*. Participation of the ubiquitin-proteasome system in sperm surface proteome remodeling during capacitation. Society for the Study of Reproduction. St. Louis, MO *(2021)*

23. Keller A[1], **Kerns K***. Deep Learning, Artificial Intelligence Methods to Predict Boar Sperm Acrosome Health. Society for the Study of Reproduction. Spokane, WA *(2022)*

24. Gustafson M[3], Keller A[1], Ramirez-Klare A[3], Grimm K[1], Reno K, Beachler T, Ferwerda N, **Kerns K***. Stallion Sperm Zinc Signature. Society for the Study of Reproduction. Spokane, WA *(2022)*

25. Grimm K[1], Keller A[1], Smith J, Dohlman T, **Kerns K***. Goat Sperm Zinc Signature. Society for the Study of Reproduction. Spokane, WA *(2022)*

26. Ramirez-Klare A[3], Gustafson M[3], Grimm K[1], Keller A[1], Smith J, Wu E, Beachler T, **Kerns K***. Canine Sperm Zinc Signature. Society for the Study of Reproduction. Spokane, WA *(2022)*

27. Keller A[1], **Kerns K***. Deep Learning, Artificial Intelligence Methods to Predict Boar Sperm Acrosome Health. Iowa Pork Congress. Des Moines, IA *(2022) (Student received 2nd place.)*

28. Mahmood M[1] & **Kerns K***. Cross-Species Sperm Proteomic Analysis for Human Male Fertility Model Establishment. Society for the Study of Reproduction. Ottawa, Canada *(2023)*

29. Jimmerson K[1] & **Kerns K***. Sperm Zinc Efflux and Overall Capacitation Rate is Affected by Bicarbonate Concentration in Bull Sperm in vitro Capacitation Media. Society for the Study of Reproduction. Ottawa, Canada *(2023)*

30. Shofner I[1], Weide T[1], Breitzman M, Jimmerson K, **Kerns K***. Lipidomics of Mammalian Sperm Capacitation. Society for the Study of Reproduction. Ottawa, Canada *(2023)*

31. Keller A[1], Keller E[3], Perry G, **Kerns K***. Identification of Distinct Proteome Differences Between Fresh and Cryopreserved Bull Spermatozoa. Society for the Study of Reproduction. Ottawa, Canada *(2023)*

32. Weide T[1], Shofner I[1], Keller A[1], Breitzmann M, **Kerns K***. Metabolism of Mammalian Sperm Capacitation. Society for the Study of Reproduction. Ottawa, Canada *(2023)*

33. Garcia-Oliveros LN[4], Keller A[1], Jimmerson K[1], Keller E[3], Maus M[3], Jennett L[3], Johnson M, Martins MM, Celeghini ECC, **Kerns K***. Sperm Biomarker-reflected Health Status Differs by Morphology Classification. Society for the Study of Reproduction. Ottawa, Canada *(2023)*

34. Zigo M, **Kerns K**, Putz A, Steible JP, Sharafi M, Sutovsky P*. Bull Sperm Zinc Signature Predictability of Sire Conception Rate. Society for the Study of Reproduction. Ottawa, Canada *(2023)*

35. Hamilton L, Zezeski A, Baldrighi JM, Assumpcao MEOA, **Kerns K**, Sutovsky P, Geary T*. The Sweet Side of Sperm: Enriching bovine semen doses using nanoparticle selection that targets the sperm glycocalyx. Ottawa, Canada *(2023)*

36. Zigo M, **Kerns K**, Ahlering P, Sutovsky P*. Comparison of Human and Porcine Sperm Zincoproteomes with Focus on Clinical and Evolutionary Implications. Society for the Study of Reproduction. Ottawa, Canada *(2023)*

37. Jimmerson K[1], Jahnke K, Keller E[3], Putz A, Demetrio D, **Kerns K***, Dohlman T*. Use of Sperm Capacitation Biomarkers to Predict In-Vitro Embryo Production Outcomes. Annual Meeting of the American Embryo Transfer Association Conference. Orlando, Florida. *(2023)*

38. Zezeski A, Gonzalez-Berrios C, **Kerns K**, Geary T*. Capacitation Signatures in Fresh and Cryopreserved Bovine Sperm. Society for the Study of Reproduction. Dublin, Ireland *(2024)*

39. Zigo M, **Kerns K**, Sutovsky P*. Proteins of Huntington's Disease Pathway Participate in Pig Sperm Capacitation. Society for the Study of Reproduction. Dublin, Ireland *(2024)*

40. Hamilton L, Zezeski A, Gonzalez-Berrios C, **Kerns K**, Sutovsky P, Geary T*. Validating Sperm Surface Lectin Targets for Use in the Nanopurification of Bull Semen. Society for the Study of Reproduction. Dublin, Ireland *(2024)*

41. Keller A[1], Perry G, **Kerns K***. Phenotyping Differentially Abundant Proteins in Cryopreserved vs Fresh Bull Sperm. Society for the Study of Reproduction. Dublin, Ireland *(2024)*

42. Shofner I[1], **Kerns K***. Deep Learning, Label-free Sperm Plasma Membrane Integrity Diagnostics. Society for the Study of Reproduction. Dublin, Ireland. Selected for Oral Presentation *(2024)*

43. Rodriguez I[1], Keller A[1], Jennet L[3], Johnson M[3], Shofner I[1], Weide T[1], Jimmerson K[1], Redel B, **Kerns K***. Sperm capacitation status correlation with porcine IVF cleavage rates. Society for the Study of Reproduction. Dublin, Ireland *(2024)*

44. Mahmood M[1], **Kerns K***. Unmixing the [Fluorescent] Spectrum of Sperm Cellular Health Utilizing High-Parameter, Image-based, Spectral Flow Cytometry. Society for the Study of Reproduction. Dublin, Ireland *(2024)*

45. Galvan EA, **Kerns K,** Ortega MS*. Paternal Aggresome Content is Associated with Increased Reactive Oxygen Species and Impaired Mitophagy during Preimplantation Development of Bovine Embryos. Society for the Study of Reproduction. Dublin, Ireland *(2024)*

46. Keller A[1], Maus M, Keller E, **Kerns K***. Deep Learning Classification Method for Boar Sperm Morphology and Label-Free Acrosome Health Analysis. International Conference on Boar Semen Preservation. Vic, Spain *(2024)*

47. Shofner I[1], **Kerns K***. Deep Learning, Label-free Sperm Plasma Membrane Integrity Diagnostics. International Conference on Boar Semen Preservation. Vic, Spain *(2024)*

48. Rodriguez I[1], Keller A[1], Jennet L[3], Johnson M[3], Shofner I[1], Weide T[1], Jimmerson K[1], Redel B, **Kerns K***. Sperm capacitation status correlation with porcine IVF cleavage rates. International Conference on Boar Semen Preservation. Vic, Spain. Selected for Oral Presentation *(2024)*

49. Mahmood M[1], **Kerns K***. Unmixing the [Fluorescent] Spectrum of Sperm Cellular Health Utilizing High-Parameter, Image-based, Spectral Flow Cytometry. International Conference on Boar Semen Preservation. Vic, Spain *(2024)*

50. Shofner I[1], **Kerns K***. Deep Learning, Label-free Sperm Plasma Membrane Integrity Diagnostics. National Association of Animal Breeders Technical Conference. Madison, WI *(2024)*

51. Rodriguez I[1], Keller A[1], Jennet L[3], Johnson M[3], Shofner I[1], Weide T[1], Jimmerson K[1], Redel B, **Kerns K***. Sperm capacitation status correlation with IVF cleavage rates. National Association of Animal Breeders Technical Conference. Madison, WI *(2024)*

52. Mahmood M[1], **Kerns K***. Unmixing the [Fluorescent] Spectrum of Sperm Cellular Health Utilizing High-Parameter, Image-based, Spectral Flow Cytometry. National Association of Animal Breeders Technical Conference. Madison, WI *(2024)*

53. Nold, E. Hamilton L, Zezeski A, Gonzalez-Berrios C, **Kerns K**, Sutovsky P, Geary T*. Validating Sperm Surface Lectin Targets for Use in the Nanopurification of Bull Semen. National Association of Animal Breeders Technical Conference. Madison, WI *(2024)*

54. Keller A[1], Perry G, **Kerns K***. Phenotyping Differentially Abundant Proteins in Cryopreserved vs Fresh Bull Sperm. National Association of Animal Breeders Technical Conference. Madison, WI *(2024)*

Invited Presentations and Seminars prior to appointment at Iowa State University

Invited Presentations

1. Localization of Candidate Proteasomal Interactors ADAM5 and NEDL2 in Porcine Spermatids and Spermatozoa. VIII International Conference on Boar Semen Preservation, IL *(2015)*

2. Capacitation-induced Changes of Candidate Proteasomal Interactors ADAM5 and NEDL2, Measured by Image-based Flow Cytometry in Porcine Spermatozoa. Oral Flash Talk, Society for the Study of Reproduction Annual Meeting, San Diego, CA *(2016)*

3. Discovery and Validation of Boar Sperm Quality and Sperm Capacitation Biomarkers Using Next Generation Image-based Flow Cytometry. Midwest Boar Stud Managers Conference, St. Louis, MO *(2016)*

4. Innovation and Entrepreneurship in Academia, Oral Presentation & Panel, Borlaug Dialogue International Symposium Iowa Ag Leaders Dinner, World Food Prize, Des Moines, IA *(2016)*

5. Unique Zinc Signature of Boar Capacitation. International Conference on Pig Reproduction, Columbia, MO *(2017)*

6. Dual Propose with Dual Benefit: A One Health Research Perspective for Iowa, Luncheon Keynote, Iowa One Health Conference, Iowa City, IA *(2017)*

7. From A(xoneme) to Z(inc): A New Paradigm for Boar Spermatozoa Fertility, Function, and Storage to Maximize Genetic Usage. North American PRRS Symposium on PRRS, Emerging & Foreign Animal Diseases and National Swine Improvement Federation Conference, Chicago, IL *(2017)*

8. Artificial Insemination and the Porcine Reproductive Toolbox. Producer Workshop, Eldon, MO *(2018)*

9. Zinc Signature of Mammalian Sperm Capacitation, Oral Platform Presentation (Top 1% of 600+ abstracts). Society for the Study of Reproduction Annual Meeting, Washington, DC *(2017)*

10. Sperm Capacitation-induced Zinc Efflux is Necessary for Increased Proteasomal Activity and Release from Oviduct Glycans of the Sperm Reservoir. Flash Oral Talk. Society for the Study of Reproduction Annual Meeting, San Jose, CA *(2019)*

11. Artificial Intelligence Analysis of the Mammalian Sperm Zinc Signature Predicts Male-factor Subfertility. Oral ePoster Competition. Society for the Study of Reproduction Annual Meeting, Online. *(2020)*

Invited Presentations and Seminars since appointment at Iowa State University

Invited Presentations

12. Bull Sperm Zinc Ion Flux as a Marker for the Acquisition of Fertilization Competency. Brazilian Association of Animal Andrology. Campo Grande, Brazil *(2021; online due to COVID).*

13. Deep Learning Classification of Boar Sperm Morphology. Society for the Study of Reproduction Annual Meeting. St. Louis, MO *(2021)*

14. Boar Sperm Zinc Ion Flux as a Marker for the Acquisition of Fertilization Competency. Boar Stud Manager Conference. St. Louis, MO *(2021)*

15. Opening the Black Box of Fertility Prediction. Midwest American Society of Animal Science Swine Translational Symposium. Online *(2021)*

16. Boar Fertility Prediction of Today and Tomorrow. American Technical Meeting for Specialists in Swine Reproduction. Minneapolis, MN *(2022)*

17. Use of Deep Learning, Artificial Intelligence for Sperm Quality and Health Assessments. Roy A. Wallace Memorial Symposium on Bovine Reproduction. Boise, ID *(2022)*

18. Sperm Zinc Ion Flux in Bulls. Roy A. Wallace Memorial Symposium on Bovine Reproduction. Boise, ID *(2022)*

19. Artificial Intelligence Models to Detect Male-factor Sub/infertility. Association for Applied Animal Andrology. Bologna, Italy *(2022)*

20. Semen Evaluation Technologies: Not as Far-Fetched as You Think? Midwest ASAS. Omaha, NE *(2022)*

21. The Present and Future of Boar Fertility Testing. Iowa Pork Industry Center Webinar Series *(2023)*

22. Current and Future State-of-the-Art Methods for Assessing Boar Fertility. Annual Meeting of American Society of Animal Science. Albuquerque, NM *(2023)*

23. Bull Fertility Evaluation: Omics & Emerging Technologies. National Center for Applied Reproduction and Genomics, Focus on the Male Webinar Series - Virtual *(2023)*

24. The Present & Future of Boar Fertility Prediction. Iowa Swine Day. Ames, IA *(2023)*

25. Sperm Capacitation Patterns as Predictor of Boar Fertility. International Conference on Pig Reproduction. Ghent, Belgium *(2023)*

26. Improving Boar Reproductive Performance through Microfused EO Supplementation. Iowa Pork Congress. Des Moines, IA *(2023)*

27. Training the Next Generation of Boar Stud Managers & Iowa State Research Update. Minitube Days. Madison, WI *(2024)*

28. Sperm Attributes: Label-free and Image-based Flow Cytometry. National Association of Animal Breeders. Madison, WI *(2024)*

29. *Upcoming:* High-throughput, Label-free Boar Sperm Fertility Phenotyping. National Swine Improvement Federation. Nashville, TN *(2024)*

Departmental Seminars

30. Zinc Ion Fluxes on the Pathway to Mammalian Sperm Fertilization Competency. Iowa State University Department Seminar Series *(2021)*

31. Center for Reproductive Biology Across Taxonomic Kingdoms. Iowa State University, College of Agriculture and Life Sciences Team-based Research Day. Ames, IA *(2024)*

32. High-throughput, Single Cell Phenotyping by Image-based Flow Cytometry. Department of Genetics, Development, & Cell Biology Research Day. Ames, IA *(2024)*

RESEARCH (65% of Appointment) – As of February 2024

Grants Directed, Co-Directed, or Consultant (names in bold identify the Principal Investigator)

Completed Grants before appointment at Iowa State University: *Extramural*

	Investigators	***Title***	***Amount***	***Source***	***Year***
1.	**K. Kerns**	Elucidating the Boar Sperm Zinc Signature	$89,266	USDA NIFA Postdoctoral Fellowship	2/2019-8/2020
2.	**K. Kerns***, S. Kerns[#] (*SBIR Academic PI; [#]Industry PI)	Optimizing Boar Sperm Fertilization Competency I	$100,000	USDA NIFA SBIR Phase I	9/2019-5/2020

3.	**K. Kerns**	Creating a boar fertility prediction model using a biomarker image-based flow cytometry approach	$95,000	USDA NIFA Predoctoral Fellowship	2017-2019

Completed Grants in Aid Since Appointment at Iowa State University: *Extramural*

	Investigators	***Title***	***Amount***	***Source***	***Year***
4.	**K. Kerns***, S. Kerns[#] (*SBIR Academic PI; [#]Industry PI)	Optimizing Boar Sperm Fertilization Competency II	$650,000	USDA NIFA SBIR Phase II	9/2020-9/2023
5.	**K. Kerns**	Investigating the Sperm Zinc Signature	$75,734	USDA AFRI NIFA	9/2020-9/2022
6.	**K. Kerns**	Elucidating Lipidome and Metabolome of Fertile Boar Sperm	$74,977	Iowa Pork Producers Association	6/2022-5/2023
7.	**T. Dohlman & K. Kerns**	Investigation of Novel Bull Sperm Capacitation Reflective Assay to Predict In Vitro Embryo Production	$14,900	Iowa Veterinary Medical Association	02/2023-01/2024

Completed Grants in Aid Since Appointment at Iowa State University: *Intramural*

	Investigators	*Title*	*Amount*	*Source*	*Year*
8.	**K. Kerns**	THUNDER Computation Clearing System	$14,040	VPR: CoSPRT	2020-2022
9.	**K. Kerns**	ImageStream Mk II^{X} Dual Camera System	$69,244	VPR: CoSPRT	2021-2022
10.	**K. Kerns**, E. Bobeck, A. Keating, T. Lubberstedt	Equipment Grant for a Sorting Flow Cytometer	$35,000	CALS/HATCH	2022-2023
11.	**K. Kerns**, E. Bobeck, A. Keating, T. Lubberstedt	Equipment Grant for a Spectral, Image-based Sorting Flow Cytometer	$120,000	CALS/HATCH	2022-2023

Current Grants in Aid since appointment at Iowa State University: *Extramural*

	Investigators	*Title*	*Amount*	*Source*	*Year*
12.	**K. Kerns**	Elucidating Sperm Fertilization Competency	$550,000	USDA AFRI NIFA	1/2022-12/2027
13.	**T. Geary**, K. Kerns	Fertility Enhancement of Spermatozoa in Cattle	$650,000	USDA AFRI NIFA	1/2022-12/2025
14.	**J. Thomas**, K. Kerns	Facilitating Expanded Use of Sex-Selection in the Commercial Beef Industry	$299,610	USDA AFRI CARE	4/2022-3/2025
15.	**K. Kerns,** I. Shofner	Training the next generation pork andrologist	$60,000	National Pork Board	10/2022-10/2024
16.	**K. Kerns,** I. Rodriguez	Training the next generation pork reproductive physiologist	$60,000	National Pork Board	8/2023-8/2025
17.	**P. Sutovsky**, K. Kerns	High Throughput Phenotyping of Polygenic Heritable Sperm Defects	$1,300,000	USDA NIFA AFRI	2023-2026

Current Grants in Aid Since Appointment at Iowa State University: *Intramural*

	Investigators	*Title*	*Amount*	*Source*	*Year*
18.	**K. Kerns**	Research Tool Revitalization: Microscopy Imaging for in vitro Fertilization	$17,000	VPR	2023-2024
19.	**K. Kerns**	Research Resource Access Mini Grant: Genomics of Sperm Subpopulations	$5,000	VPR	2023-2024

20.	**S. Selsby**, A. Keating, K. Kerns, L. Baumgard, S. Hansen, E. Bobeck	Energizing Livestock Research: A Deep Dive into Mitochondrial Dynamics Amidst Climate Variability	$150,000	CALS/HATCH	2023-2024

Pending Grants in Aid: *Extramural*

	Investigators	***Title***	***Amount***	***Source***	***Year***
21.	**K. Kerns** & S. Ortega	Elucidating the Basis for Bull Contribution to Fertilization and Embryo Development Success	$650,000	USDA AFRI NIFA	8/2023
22.	**K. Kerns**	Paternal Influence on Early Pregnancy Loss	$3,726,702	NIH NICHD – Katz R01	9/2023
23.	**C. Youngs**, A. Johnson, S. Pandey, S. Schmitz-Esser, K. Kerns, J. Steibel	Precision Livestock Breeding: Digitalization of Animal Production to Help Feed the World	$870,643	Tata Consultancy Services Limited	2/2024* **Pending VPR / Foundation Submission*
24.	**A. Desaulniers** & K. Kerns	Enhancing Male Fertility via Extracellular Vesicle-Mediated Lactocrine Programming of the Testis	$403,928	NIH R21	2/2024

Pending Grants in Aid: *Intramural*

	Investigators	***Title***	***Amount***	***Source***	***Year***
25.	**T. Lubberstedt,** K. Kerns, S. Kumar *Status: Invited to final round.*	Reproductive studies to advance breeding and fight disease across taxa	$450,000	ISU PIRI	1/2024

Grant Proposals Submitted, but Not Funded Since Appointment at Iowa State University

	Investigators	***Title***	***Amount***	***Source***	***Year***
26.	**K. Kerns** *Ranked: Finalist*	Investigating Bull Subfertility to Increase Reproductive Performance of U.S. Cattle Herds and Reduce Carbon Footprint	$450,000	FFAR	2022
27.	**K. Kerns** *Program halted before review.*	Single cell bioimage deep learning for the prediction of male fertility	$20,000	NVIDIA	2022

28.	**K. Kerns**, J. Selsby, & A. Keating	TIRF Fluorescent Inverted Microscope Imager	$298,051	CALS/HATCH	2021
29.	**K. Kerns** *LOI submitted, not invited.*	Sperm Methods to Increase Sow Reproductive Performance	$69,416	Iowa Pork Producers Association	2023
30.	**K. Kerns** & T. Lubberstedt	High Throughput Phenotyping of Animal and Plant Gametes	$250,000	Ag Genome to Phenome Initiative (AG2PI)	2023
31.	**T. Dohlman** & **K. Kerns**	Investigation of a Novel Bull Sperm Capacitation Reflective Assay to Predict In Vitro Embryo Production	$11,900	American Embryo Transfer Association	2023
32.	**G. Perry** & K. Kerns	Flow Cytometric Analysis of Sperm Biomarker to Predict Bull Fertility	$650,000	USDA NIFA AFRI	2023
33.	**D. Miller** & K. Kerns	Novel-Omic Effects of Scrotal Hyperthermia on Germ Cells in the Testes and Epididymis	$650,000	USDA NIFA AFRI	2023
34.	**D. Miller** & K. Kerns	Novel Effects of Scrotal Hyperthermia on Sperm and Epididymal Maturation	$2,000,000	NIH R01	2023
35.	**M. Zigo** & K. Kerns	Sperm as a Model for Neurogenerative Diseases	$650,000	USDA NIFA AFRI	2022
36.	**T. Lubberstedt** & K. Kerns	Gamete Phenomics and Genomics to Advance Crop and Animal Breeding	$450,000	ISU PIRI	2023
37.	**T. Lubberstedt** & K. Kerns	Leveraging Reproductive Mechanisms Across Kingdoms	$740,000	ISU Presidential Strategic Vision	2023
38.	**J. Selsby** & K. Kerns	Microplate Reader for Physiology	$50,299	CALS/HATCH	2022
39.	**K. Kerns** & J. Koltes	Pig as a Model for Paternal Influence on Early Pregnancy Loss	$2,985,509	NIH USDA Dual Purpose R01	2022
40.	**P. Sutovsky** & K. Kerns	Paternal Contributions to Early Pregnancy Loss in Cattle	$2,750,000	NIH USDA Dual Purpose R01	2022
41.	**E. Celeghini** & K. Kerns	Relationship between sperm capacitation and fertility in cryopreserved semen: emphasis on microRNA profile and sperm metabolomics	$250,000	FAPESP	2023

42.	**K. Kerns**	High-throughput Phenome to Genome Pipeline for Boar Infertility	$800,000	USDA NIFA AFRI	2023

Grant Proposal Summary Table – As of February 2024

Dollars	***Category***
$284,266	Completed Grants before appointment at Iowa State University as PI: *Extramural*
$815,611	Completed Grants in Aid Since Appointment at Iowa State University as PI/Co-PI/Co-I/ Consultant: *Extramural*
$238,284	Completed Grants in Aid Since Appointment at Iowa State University as PI/Co-PI/Co-I/ Consultant: *Intramural*
$2,919,610	Current Grants in Aid since appointment at Iowa State University as PI/Co-PI/Co-I/ Consultant: *Extramural*
$172,000	Current Grants in Aid Since Appointment at Iowa State University as PI/Co-PI/Co-I/ Consultant: *Intramural*
$1,735,995	Total Grants in Aid Since Appointment at ISU as PI: Extramural and Intramural
$4,135,605	Total Grants in Aid Since Appointment at ISU as PI/Co-PI/Co-I/Consultant: Extramural and Intramural
$2,030,161	Total Grants in Aid Since Over Entire Career as PI: Extramural and Intramural
$4,429,771	Total Grants in Aid Since Over Entire Career as PI/Co-PI/Co-I/Consultant: Extramural and Intramural
$6,074,845	Pending Grants in Aid: *Extramural*
$13,075,175	Grant Proposals Submitted, but Not Funded Since Appointment at Iowa State University

Visiting scholars mentored since appointment at Iowa State University

1. Laura Nataly Garcia Oliveros (February 15, 2023 - August 15, 2023) – Six-month PhD student studying at the University of Sao Paulo visiting to learn image-based flow cytometry skills for bovine sperm analysis. Resulted in a poster presentation at SSR 2023 with manuscript in progress.

2. Dr. Shouhei Kurata (January 16, 2024 - March 7, 2024)– Seven week visiting scholar from Yamanashi Prefectural Government (Japan), Livestock Industry Division to study porcine in vitro fertilization, culture, and embryo cryopreservation. Part of the Iowa-Japan sister state relationship. Goals are to learn how to perform embryo

cryopreservation in order to preserve the "Iowa Pig Lift" genetics donated by Iowa seedstock producers decades ago to protect from the threat of African Swine Fever.

Intellectual Property

Before ISU

1. "Mammalian Sperm Decapacitating Supplement." Invention Disclosure No. 18UMC071. Submitted 2018. Patent pending.
2. "Mammalian Sperm Fertility Capacity Test." Invention Disclosure No. 18UMC072. Submitted 2018. Patent pending.

   These two invention disclosures are currently combined into one provessional patent and will be processed individually upon patent examiner's recommendation. Sperm Fertility Capacity Test & Decapacitating Supplement. Status: Provisional, May 2018, International U.S. Priority Application No. 62/673,356.

After Appointment at ISU

3. "Deep learning boar sperm auto morphology scoring of image-based flow cytometry samples." Invention Disclosure No. ISURF 05255. 2021.
4. "Deep learning, label-free detection of infertile boar spermatozoa trained by lectin PNA." Invention Disclosure No. ISURF 05256. 2021.

Research-related developmental activities since appointment at Iowa State University

2021: Participant: Grant Writers' Seminars & Workshops: Write Winning Grant Proposals

2023: Participant: Grant Writers' Seminars & Workshops: Write Winning Grant Proposals
Selected to participate in in-depth Phase II workshop

2023: Participant: NIH Grant Writing Workshop by Dr. Geetu Tuteja

Graduate Student Mentorship - *ANS 699F (Research: Physiology of Reproduction) & GENET 699 (Research)*

There is a wide range of philosophy in graduate student mentorship. Thesis and dissertation credits formally makes up approximately over half of a graduate student's formal credits. Dr. Kerns has regular weekly meetings with each student to meet one-on-one, discuss, and guide them in their program including during the summer months. Additionally, Dr. Kerns leads a weekly lab meeting and journal club to make up for the reduced critical mass of reproductive physiology courses taught. Dr. Kerns ensures that each student is doing state-of-the-art studies which support their future career goals and helps them network with potential future employers.

Supervision of Graduate Students

Student	*Degree/Date*	*Major*	*Notes*
Major Professor			

Alexandra Else-Keller	PhD, Current	Interdepartmental Genetics & Genomics	2nd Place Poster Competition at Iowa Pork Congress 2022
Mubashrah Mahmood	PhD, Current	Animal Science, Physiology	US-Pakistan Knowledge Corridor Fellowship
Tyler Weide	PhD, Current	Interdepartmental Genetics & Genomics	USDA National Needs Scholar
Kourtney (Grimm) Jimmerson	MS, May '24	Animal Science, Physiology	
Ian Shofner	PhD, Current	Animal Science, Physiology	National Pork Board Fellowship; Oral Presentation at Society for the Study of Reproduction 2024
Isabel Rodriguez	MS, Current	Animal Science, Physiology	National Pork Board Fellowship; Oral Presentation at International Conference on Boar Semen Preservation 2024
Emily Nold	MS, Current	Animal Science, Physiology	

Program of Study Committee

Alexis Jones	MS, Dec '23	Animal Science, Reproductive Physiology	University of Missouri-Columbia
Tori Rudolph	PhD, Dec '23	Interdepartmental Genetics & Genomics	Iowa State University
Everardo Anta Galvan	PhD, Current	Animal Science, Reproductive Physiology	University of Wisconsin-Madison
Abby Zezeski	PhD, Current	Animal Science, Reproductive Physiology	Montana State University
(Mike) Huy Pham	MS, Current	Animal Science, Animal Breeding and Genetics	Iowa State University
Missey Roths	MS, Current	Interdepartmental Genetics & Genomics	Iowa State University
Imaobong Inyang	PhD, Current	Interdepartmental Bioinformatics & Computational Biology	Iowa State University

Rotation Students
Alexandra Keller – Interdepartmental Genetics & Genomics Fall 2021
Thomas Burns – Interdepartmental Genetics & Genomics Summer 2021

TEACHING (30% of Appointment)

Courses Taught

Primary Responsibilities

Animal Science 214L (Iowa State University – offered each semester) taught and oversaw for the previous 8 semesters (including current) – "Domestic Animal Anatomy & Physiology" 6 sections, 1 credit. Fall 2020 – present. 150-185 students/semester. Dr. Kerns is responsible for delivering course material and evaluating student knowledge. This course presents an overview of the major anatomical and physiological systems with an emphasis on mammals. (*Responsibilities – 50% Fall 2020; 100% Spring 2021-present*). In addition, associated with this class is the management of a team of two head graduate TA's and 8-20 undergraduate TA's/semester.

Animal Science 490I (Iowa State University) – "Entrepreneurship of Animal Science Farms" 1 credit. Staring in Spring 2024. Course in partnership of the CALS Start Something program. Dr. Kerns is responsible for delivering course material, leading discussions, and evaluating student knowledge. This course is designed to provide students a background of entrepreneurship while investigating opportunities for ISU ANS Farms. (*Responsibilities – 100%*).

Training and Supervision of Undergraduate Teaching Assistants for ANS 214L

Fall 2021	*Spring 2022*	*Fall 2022*	*Spring 2023*	*Fall 2023*	*Spring 2024*
Calah Sewell	Rebecca Wilson	Megan Buyert	McKenna Riess	Renee Grimm	Anastasia
Sydney Honold	Seth Boss	Pheobe Ditrinco	Joanne Drago	Teresa Reguero	Siebrecht
Abigail Prow-Miele	Taylor Flemming	Boston Gilpin	Jenna Hibma	Connor Becker	Riley Thill
Ralph Delgado	Isabel Rodriguez	Ilsa Johnson	Emily Trumm	Victoria Jezioro	Isabella Roberts
Courtney Davis	Vivian Flores	Kassidy Kupka	Hallie Hanssen	Reace Thomas	ShyAnne
Adrian Ramirez Klare	Reese Wooden	Kamryn Lesle	Tyann Townes	Brooke Johnson	Brogden
Emilee Peterson	Jaedyn Winter	Electra Morgna Li	Maggie Stutzman	Grace	Bailey
Taylor Flemming	Natalie Seemann	Bassi	Amber Witt	Townsend	DuChene
Morgan Johnson	Adrian Ramirez	Natalie	Hannah Lanphere	Ella Wolfrom	Renee Grimm
Elizabeth Parra	Klare	Palmersheim	Renee Grimm	Katherine	Ella Wolfrom
	Kamryn Lesle	Emma Pratt	Brooke Johnson	Scheflen	Kaylee Shaner
	Sydney Honold	Teresa Reguero	Rylee Hundley	Katherine	Mai Bussanmas
	Teresa Reguero	Isabel Rodriguez	Kolin Richardson	Cubbage	Alyvia Hout
	Benjamin	Natalie Seeman	Jennifer Boor	Megan Johnson	Halle Evans
	Altendorf	Karlee Skinner	Kassidy Croghan	Jakob Hall	Isabella Gurau
	Phoebe Ditrinco	Mariah Steenhard	Tania Carbajal	Riley Thill	Maleah Upton
	Karlee Skinner		Mikayla Brennan	Emily Trumm	Jenna Shahan
	Molly Gustafson		Irene Nielsen	Xin (Pheobe)	Megan Johnson
			McKenzie	Khoo	Tyann Townes
			McAninch	Haley Nelsen	Stephanie
			Abigail (Abby)	Kaylee Shaner	Rodriguez
			Kaska	Averi Sievert	Katherine
			Emma Keller	Anastasia	Jensen
			Grace Townsend	Siebrecht	Haley Onken
			Madison Funk	Joanne Drago	Lauren Seegers
				Emma Keller	

			Katherine Cubbage Rachel Lucas Nicole Ullman Ryli Abildtrup Grace Nixon Kamryn Lesle Pheobe Ditrinco Teresa Reguero	Maggie Stutzman	Katherine Cubbage Madison Grow Jordyn Collins Sarah Eiler Zoey Hightshoe Daley Harrison Paige Evans Noelle Wiener Sadye Lyons
Total: 10	16	14	31	22	29

Training and Supervision of Undergraduate Teaching Assistants for ANS 214L

Graduate Student	*Semester*
Crystal Roach	Spring 2021
Alexandra Else-Keller	Fall 2020 - Current
Kourtney (Grimm) Jimmerson	Spring 2021 - Current
Total: 3	

Additional Recurring Course Contributions

Animal Science 549 (Iowa State University – offered each fall semester) team taught for two semesters (Fall 2022 and 2023) – "Advanced Vertebrate Physiology" 4 credits. Dr. Kerns delivers lectures related to male reproductive physiology in this introductory graduate level physiology course. (*Contribution – 2x 2 hr lectures; Course taught by Dr. Josh Selsby*).

Animal Science 633 (Iowa State University) – "Seminar in Animal Reproduction" 1 credit. Dr. Kerns was responsible for delivery of seminar and evaluating student knowledge. This course teaches and evaluates students on providing scientific seminars in animal reproduction. (*Responsibilities – 100% Fall 2022*).

Biochemistry, Biophysics, and Molecular Biology 590 (Iowa State University) – "Special Topics: Image-based Flow Cytometry Analysis" 1 credit. Dr. Kerns was responsible for delivering course materials and evaluating student knowledge. This course provided as a one time offering in partnership with Dr. Joshua Beck. *(Responsibilities – 100% Spring 2023*).

Additional One Time / Irregular Course Contributions

Animal Science 214 (Iowa State University) – "Domestic Animal Physiology" 3 credits. Spring 2022 to present for the online section. Dr. Kerns guest lectures one lecture/semester for the online section on male reproduction. (*Contribution 1x 1 hour lecture; Course taught by Dr. Dawn Koltes).*

Economics 334 (Iowa State University) – "Entrepreneurship in Agriculture" 3 credits. Dr. Kerns was responsible for evaluating and providing feedback to students on business proposal creation process. (*Contribution – approximately one third of lectures, Spring 2022; Course taught by Kevin Kimle*).

Animal Science 211 (Iowa State University) – "Issues Facing Animal Science" 1 credit. Dr. Kerns provided one lecture per semester on the topic of biological ethics and entrepreneurship as it relates to the animal science field. (*Contribution – 1x 1 hr lecture; Spring 2022 & 2023 and Fall 2022; Course taught by varying instructors over time of guest lecturing*).

Undergraduate Research and Independent Study

Directed and supervised independent laboratory projects in reproductive physiology. Courses include AnS 490 (Independent Study) and Undergraduate Research Assistantship (URA). (Responsibilities – 100% - Instructor/mentor).

Supervision of Undergraduate Research Students

Student	*Program*	*Semester*	*Notes*
McKenna Maus	URA	Sp '21-Sp '23	MS Student with Dr. Youngs
Molly Gustafson	AnS 490	Sp '22	Presented poster at SSR
Adrian W. Ramirez Klare	AnS 490	Sp '22	Presented poster at SSR; Kent Food Challenge Team – 3rd Place
Ines Rodriguez Pascual	URA	Su '22	Kent Food Challenge Team – 3rd Place
Macy Moore	URA	Su '22	Kent Food Challenge Team – 3rd Place
Leah Griener	URA	Sp '22	Kent Food Challenge Team – 3rd Place
Emma Keller	URA	Fa '21-Sp '24	
	490	Sp '24	
Lindsey Jennett	URA	Fa '22-Present	
Megan Johnson	URA	Fa '22-Present	

Teaching-Related Development since appointment at Iowa State University

Grants in Aid since appointment at Iowa State University: *Intramural*

	Investigators	***Title***	***Amount***	***Source***	***Year***
1.	**K. Kerns**	CALS Innovation Faculty Fellows	$5,000	CALS	2021-2022
2.	**K. Kerns**	CALS Kent Innovative Food Challenge	$5,000	CALS/Kent	2022

Pending Aid since appointment at Iowa State University: *Intramural*

	Investigators	***Title***	***Amount***	***Source***	***Year***
3.	**K. Kerns** & T. Brumm	Tailored AI Tutoring for Improved Student Outcomes in Animal Science and Engineering Disciplines	$50,000	Miller Faculty Fellowship - AI Call	2023
4ß.	**K. Kerns** & K. Kimle	Cultivating Agri-Innovators: Creation of a Classroom AgriVenture AI Engine to Grow Agricultural	$50,000	Miller Faculty Fellowship - AI Call	2023

	Entrepreneurship to New Heights

Teaching-Related Developmental Activities since appointment at Iowa State University

2023: Attendee: “Embedding Our Students Well-being in Learning Environments” Ames, Iowa.
2022: Attendee: “Supporting Our Students Through a Mindful and Learner-Centered Syllabus” Ames, Iowa.
2021: Attendee & Participant: “Experiential Classroom XXI” South Bend, Indiana.
Attendee & Participant: “CELT Teaching Workshop” Ames, Iowa.
2020: Attendee: “Strategies to Create an Inclusive Classroom” Ames, Iowa.

SERVICE & PROFESSIONAL PRACTICE (5% of Appointment)

Professional Affiliations and Activities

Member, 2014 – present:	Society for the Study of Reproduction
Member, 2015 – present:	American Association for the Advancement of Science
Member, 2021 – present:	Gamma Sigma Delta
Member, 2021 – present:	Sigma Xi, The Scientific Society
Member, 2013:	Beta Beta Beta Biological Honors Society
Member, 2013:	Cardinal Key Honor Society
Member, 2011:	Alpha Zeta Honor Fraternity

Awards and Honors

2024:	Miller Faculty Fellow
2024:	Gamma Sigma Delta Early Career Research Mission Award
2022:	CALS Innovation & Entrepreneurship Faculty Fellow
2020:	SSR Postdoctoral Poster Competition – 1st Place
2020:	USDA NIFA AFRI SSR Scientific Merit and Impact Award
2020:	University of Missouri Distinguished Dissertation Award
2019:	USDA National Institute of Food and Agriculture Postdoctoral Fellow **($165,000)**
2019:	Society for the Study of Reproduction (SSR) Trainee Travel Award (1 of 20)
2019:	Missouri Life Sciences Week; Animal Biology, Health & Disease - 1st Place
2019:	Iowa State University STATEment Maker, Academia Division
2018:	Missouri Life Sciences Week Plant and Animal Physiology & Health, 2nd Place
2018:	Animal Science Graduate Forum, University of Missouri - 1st Place PhD Oral
2015 - 2018:	Larry Ewing Memorial Trainee Travel Award, SSR
2017:	National Swine Improvement Federation (NSIF) Graduate Student Award
2015 & 2017:	Douglas D. Randall Young Scientists Development Award, University of MO
2017:	USDA NIFA AFRI SSR Scientific Merit and Impact Award
2017:	SSR Trainee Platform Finalist (Top 1% of 600+ abstracts)
2017:	USDA National Institute of Food and Agriculture Predoctoral Fellow **($95,000)**
2015:	Animal Science Graduate Forum, University of Missouri, 2nd Place PhD Poster
2014 - 2016:	Miller Fellow, University of Missouri
2014 - 2016:	Graduate College Fellow, University of Missouri
2014:	ISU CALS Senior Leadership Award
2013:	Murray Wise Agricultural Entrepreneurship Award ($10,000)
2013:	Iowa Governor Branstad Agricultural Leadership Award

Ad Hoc Reviewer since appointment at Iowa State University

Animal Reproduction
Animals
Biology of Reproduction
Frontiers in Veterinary Science
Journal of Animal Science
Journal of Dairy Science
Reproduction, Fertility, and Development
Scientific Reports
Theriogenology

KARL KERNS
CURRICULUM VITAE

Service and Committee Membership since appointment at Iowa State University

<u>International</u>

International Journal of Molecular Sciences (IF=5.6) Special Issue "Recent Progress in Molecular Mechanisms of Sperm Metabolism and Development" Guest Editor	2023 - Present

<u>National</u>

Society for the Study of Reproduction, Development Committee	2023 - Present
Society for the Study of Reproduction, Abstract Reviewer	2022, 2024
National Association of Animal Breeders, Academic Adviser	2023 - Present
National Association of Animal Breeders, Technical Conference Planning Committee	2023 - Present
NSF SBIR, Panel Member	2022
USDA NIFA AFRI Higher Education Multicultural Scholars, Panel Member	2022
USDA NIFA AFRI Reproduction, Conference Panel Member	2022

Note: Declined USDA NIFA AFRI Reproduction Panel (non-conference) 2022 invitation due to submission of proposal to that panel.

<u>University</u>

Biotechnology Council	2023 - Present
Interdisciplinary Genetics & Genomics, Curriculum Committee	2023 - Present
Interdisciplinary Bioinformatics & Computational Biology, Admissions Committee	2023 - Present
Interdisciplinary Genetics & Genomics, Admissions Committee	2024

Honor Societies I serve that recognize student achievements:

Sigma Xi (Executive Committee 2022 – Present)	2021 - Present
Gamma Sigma Delta (President – 2023)	2021 - Present

<u>College</u>

CALS Associate Dean for Research and Discovery Search, Committee Member	2024
CALS Committee on the Advancement of Student Technology for Learning Enhancement	2022 - Present
Creation of Innovation & Entrepreneurship Faculty Fellows, Program Committee	2021

<u>Departmental Standing Committees</u>

Chuck Wagon Committee	2021 - Present
Seminar Committee	2021 - 2022
ANS Committee on the Advancement of Student Technology for Learning Enhancement)	2022 - Present

Departmental Ad Hoc Committees

Majors of the Future Task Force	2022 - Present
Fostering Student Innovation Committee	2022 - Present
Association of Graduate Animal Scientists, Adviser	2021 - Present
Department Chair Search Committee	2022
John Patience Nutrition Chair Search Committee	2022
Technician for Physiology 2300 Hallway Hire, Committee	2021
ADVANCE Department Review Task Force	2020