NANOVACCINE INSTITUTE

NANOVAX NEWS

Nanovaccine Institute newsletter, Volume 5: Winter 2022

Where Are They Now?

Jennifer Wilson-Welder
Research Microbiologist
US Department of Agriculture, Agricultural Research Service

In 2002, Jennifer Wilson-Welder was part of the first group of students at Iowa State University working under Balaji Narasimhan and Michael Wannemuehler, who were conducting research on microparticles and polyanhydrides. She says, “It was a lot of trial and error back in those days–it was exciting.”

Wilson-Welder completed her Bachelor’s, Master’s, and PhD degrees at Iowa State University, working in Wannemuehler’s lab for almost fifteen years. In 2009, she finished her PhD and thesis which provided “proof of concept showing that microparticles could be used as vaccine delivery vehicles.”

Wilson-Welder says about that time, “The fun thing about working with Mike Wannemuehler’s team was he never told us ‘no.’ It was always ‘let’s go see.’ I felt like I was playing every day in the lab. We were breaking new ground and at the cutting edge–it was so fun.” Her research areas then included immunology, classical microbiology, and vaccinology.

In 2009–2011, Wilson-Welder did a postdoc with Dennis Metzger at Albany Medical College in New York, where she researched mucosal immunology and IgA deficiency.

In 2011, she began her current role with the U.S. Department of Agriculture’s Agricultural Research Service, where she is part of the Infectious Bacterial Diseases Research group at the National Animal Disease Center in Ames, IA. Her current research areas include bovine diseases that are zoonotic to humans, and looking at ways to improve vaccines.

Wilson-Welder says she is proud of recent accomplishments in the study of bovine hoof disease in sheep and developing better models. She has also worked towards animal welfare and says she enjoys “working for the greater good, healing animal disease, and coming up with solutions for producers which ultimately do better for animals.”

Wilson-Welder’s research on elk hoof disease was recently featured in the journal Veterinary Pathology.

She is now serving on an interdisciplinary team of a dozen scientists from across the U.S. who are drafting policy and direction for the next five years of ARS’s antimicrobial research.

Wilson-Welder lives with her husband on four acres of woodland in the Des Moines River valley near Ogden, IA. She enjoys watching birds and pursuing creative outlets such as fiber arts, spinning, weaving, knitting, and quilting. She has two house rabbits.

“[I was] there at the very beginning of the [Nanovaccine Institute]. To see what it has become and what it has grown into, none of us could have imagined at that time.”

Word of the Year

“Vaccine” is the

2021 Merriam-Webster Word of the Year.

CTO Corner

Mike Roof
Chief Technology Officer
Vaccines & Immunotherapeutics platform
Iowa State University

The State of Iowa's focus on the BioScience Platform – Vaccines and Immunotherapeutics continues to drive accelerated funding, job creation, and economic development. In the past quarter, we have made major progress on funding, strategic partnerships, and infrastructure.

Iowa State University Vice President for Research
Seed Grants and Commercial Development Fellowship

The Iowa State Seed Grant program completed another round of funding in October. We had ten quality submissions and were able to fund five new seed grants totaling $250,000 focused on vaccines and immunotherapeutic technology. This round includes projects on probiotics, nanovaccines, vector-based vaccine development, advanced sensors, and technology to address antimicrobial resistance. Funding went to faculty across Iowa State colleges, ensuring that the platform is providing broad and high-value support. For 2021, this seed grant funding provided nearly $500,000 of support to ten different investigators and projects.

We have also initiated a new Commercial Development Fellowship which will focus on financially supporting the commercialization of technology. The primary goal of the funding is to provide bridge funding to support salary costs which would allow a focused effort on commercial projects, and could be used to support post-graduation funding of graduate students and post docs who plan to transition into a dedicated startup role or faculty position. In addition, these funds could be used for legal, manufacturing, or regulatory support, which are critical to commercial success. This fellowship has yet to be awarded ($50,000) and so anyone interested is encouraged to contact me for more information (mroof@iastate.edu)

New Infrastructure: Cy VAX Commercial Development Laboratory

Based on feedback from faculty and our industry partners, we have determined a commercial need for both a cGMP nanoparticles formulation and manufacturing lab, as well as a USDA-compliant vaccine laboratory. Many of our faculty and partners are ready to expedite technology transfer of vaccines to companies in the animal health industry. Therefore, we have begun discussions with the USDA Center for Veterinary Biologics, Iowa State University Research Park, and Iowa State faculty to discuss the development of a USDA-compliant vaccine laboratory focused on master seed development, USDA standard documentation and testing, potency and analytical methods, and bioprocess/scale up to manufacture USDA-compliant clinical material.

In partnership with the ISU Research Park, ISU College of Veterinary Medicine, the Nanovaccine Institute, and the ISU Vice President for Research, in 2022 we will open Cy VAX Laboratories to support vaccine and immunotherapeutic vaccine commercialization. This laboratory will be a low-cost opportunity to support companies in commercial development. The laboratory will be located in Building 3 of the ISU Research Park in Ames, IA and will allow companies a flexible solution to gain lab access.

In addition to the facility, Cy VAX will also offer:

- $130,000 of laboratory equipment for use – including but not limited to biosafety cabinets, incubators, refrigerators, freezers (-20/-70), liquid nitrogen storage, and mid-sized production scale-up equipment;
- Both internal Iowa State and external USDA licensing expertise;
- Some technical support to facilitate laboratory efforts and linkage to Iowa State infrastructure;
- Technology development outside of the university for company-specific intellectual property or technology.

The laboratory can support four to six commercial projects concurrently and we are now accepting applications to use the facilities. Please contact me (mroof@iastate.edu) for further information and laboratory access.

Welcome New Nanovaccine Institute Member!

Robbyn Anand

Dr. Robbyn Anand is an Assistant Professor in theIowa State University Department of Chemistry. Her research focuses on the development of microfluidic technologies that address critical needs in cancer and kidney disease, including microdevice design and fabrication to create wearable technology for patients.

Quoted

"The beauty of mRNA is that it's a hardwired biological process. If you put an mRNA into a cell, the cell will make whatever that mRNA encodes, and that's going to be the same biological process in adults as it is in kids. [mRNA is] one of the most natural ways to make a vaccine."

Dr. Sean Murphy
Center for Emerging and Re-Emerging Infectious Diseases
University of Washington

Congratulations to Nanovaccine Institute Members!

Dr. Noah Butler with the University of Iowa Carver College of Medicine was appointed to the Mark Stinski Professorship in Immunology. Dr. Butler is nationally recognized in the field of microbiology and immunology.
Read more

Dr. Richard Webby of St. Jude Children's Research Hospital was named to the 2021 list of Highly Cited Researchers by the Institute for Scientific Information at Clarivate.
Read more

Dr. Nigel Reuel (second from left) of Iowa State University and his start-up, Skroot

Dr. Nigel Reuel (center) and his start-up Skroot Laboratory Inc. received the Achieve-

Laboratory Inc., received first prize at the Pappajohn Iowa

Entrepreneurial Venture Competition 25-year Gala in Des Moines, Iowa on September 23.

ment in Intellectual Property award from Iowa State University. The award recognizes individuals or teams of faculty or staff for outstanding university-based achievements in producing intellectual property.

Dr. Nigel Reuel also received Iowa State's Early Achievement in Research award from Vice President for Research Peter Dorhout and President Wendy Wintersteen. This award recognizes a tenured or tenure-track faculty member who has demonstrated outstanding accomplishments in research and/or creative activity unusually early in their professional career.

Nanovaccine Institute scientist Dr. Kathleen Ross (center) was honored by Iowa State University as a Professional & Scientific Outstanding New Professional! This award recognizes a professional and scientific staff member who has demonstrated outstanding accomplishments unusually early in their professional career.

University of Georgia professor Dr. Anumantha Kanthasamy was elected a Fellow of the National Academy of Inventors. Kanthasamy is an internationally renowned researcher of Parkinson's disease and related neurodegenerative disorders. Read more

Dr. Thomas Friedrich received the 2021 Zoetis Award for Veterinary Research Excellence which recognizes researchers whose innovative studies have advanced the scientific standing of veterinary medicine.

Dr. Friedrich is a Professor of Pathobiological Sciences at the University of Wisconsin-Madison School of Veterinary Medicine and Head of Virology Services at the Wisconsin National Primate Research Center.

In the News

Dr. Christine Petersen, director of the Center for Emerging Infectious Diseases at the University of Iowa College of Public Health, was interviewed by CBS News about coronavirus precautions at crowded gatherings.

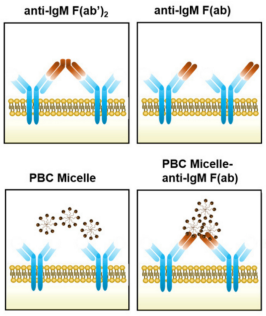
See more

The World Health Organization recommended a malaria vaccine for children across Africa for the first time. University of Washington researcher Dr. Sean Murphy and his laboratory are developing the malaria vaccine of the future.

Read more

Nanovaccine Institute researchers at Iowa State University explain how nanomaterials aid antibody response and can turn B cells into antibody factories. The nanomaterial platform can be “a highly versatile tool in the development of multiple countermeasures against emerging and reemerging infectious diseases,” said their recent article in Science Advances.

Read more



Publications

Please send announcements of publications and other research updates to joelsev@iastate.edu for inclusion in future newsletters and social media.

Kshirsagar PG, Gulati M, Junker WM, Aithal A, Spagnol G, Das S, Mallya K, Gautam SK, Kumar S, Sorgen P, Pandey KK, **Batra SK, Jain M.** “Characterization of recombinant β subunit of human MUC4 mucin (rMUC4β)”. Scientific Reports 11: 23730. 2021 December. www.nature.com/articles/s41598-021-02860-5.

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Beasley, E., Pessoa-Pereira, D., Scorza, B.M., **Petersen, C.A**. (2021) “Epidemiologic, clinical and immunological consequences of con-infections during canine leishmaniasis”, Animals, 11, 3206. doi: 10.3390/ani11113206.

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Gomes-Solecki, M., O’Connell, K., Nair, N., Brisson, D., Ostfeld, R.S, Penney, J., Oleson, J.J,**Petersen, C.A**., Brown, G.D. (2021) “Maternal transfer of neutralizing antibodies after oral immunization with OspA and statistical modeling of their impact in the enzootic cycle of *B. burgdorferi*”, Vaccine 39: 4320–4327. doi: 10.1016/j.vaccine.2021.06.025.

Kushwaha, A.K, Singh, O.P., Singh, S.K., Rowton, E., Lawyer, P.,**Petersen, C.A**., Sundar, S., (2021) “Domestic Animals as Reservoirs for *Leishmania donovani* on the Indian subcontinent: Possibility and Consequences on Elimination”, Transboundary and Emerging Diseases, doi: 10.1111/tbed.14061.

Meyers, A.C, Auckland, L., Meyers, H.F., Rodriguez, C.A., Kontowicz, E.,**Petersen, C.A**., Travi, B.L., Sanders, J.P., Hamer, S.A. (2021) “Epidemiology of Vector-Borne Pathogens among U.S. Government Working Dogs”, Zoonotic and Vector Borne Dis. doi: 10.1089/vbz.2020.2725.

Alonso, F., Vasilatis, D., Veluvolu, S., Wilcox, J., Scorza, B.M.,**Petersen, C.A**., Kol, A. (2021) “Canine leishmaniasis in Northern California–A case report”, Vet. Clin. Path. doi: 10.1111/vcp.12956.

Nanovaccine Institute Updates

NANOVACCINE INSTITUTE **Seminar Series**

The Nanovaccine Institute is presenting monthly seminars via Zoom with 45 minutes of presentation followed by 15 minutes of audience Q&A. Our seminars feature researchers from leading biomedical and animal health labs and institutions across the country. Learn more about the wide-ranging and innovative research being done by Nanovaccine Institute members and partners! To present, please contact joelsev@iastate.edu.

Thursday, Jan. 27, 2022
3:00 – 4:00 pm CT

Renukaradhya Gourapura DVM, MS, PhD
Professor, Center for Food Animal Health
The Ohio State University

“Type and depth of mucosal immunity in the airways induced by intranasal vaccines is dictated by the nature of polymer used in nanovaccines: studies in a pig model.”

Learn more: https://bit.ly/3eNkTeG
Register: https://conta.cc/3JCJzVg

On September 30, Iowa State University held a celebration of the Nanovaccine Institute and its new space on the 5th floor of the Advanced Research and Teaching Building, which was made possible because of generous donors including Jim and Julie Balloun of Atlanta, GA.
(Pictured L to R: Larissa Holtmyer Jones, Julie Balloun, Jim Balloun, Balaji Narasimhan, Sean Kelly, President Wendy Wintersteen).

Follow the Nanovaccine Institute on Social Media

The Nanovaccine Institute is active on social media: Twitter, LinkedIn, Instagram and YouTube. Follow us to hear about research updates, publications, funding announcements, partnerships, new members, and other updates from your labs.

Please send any updates for social media, the website, or the next edition of Nanovax News to joelsev@iastate.edu.

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