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Ph.D. Student in Chemical Engineering, admitted Autumn 2021

Publications

PUBLICATIONS

- **A 3D-Printed Scaffolded Hydrogel Microneedle Array Biosensor for Real-Time, Continuous Monitoring.** *Advanced materials (Deerfield Beach, Fla.)*
Kwak, J. W., Trinh, T., White, A. D., Chen, Y., Eckman, N., Jain, I., Xu, Y., Nguyen, N., Gopalan, D., Kim, Y. E., Unni Kamat, N., Tumbleston, J. R., Park, et al
2026: e73325
- **Small-Angle Neutron Scattering Reveals Structural Hierarchy of Polymer- Nanoparticle Hydrogels** *MACROMOLECULES*
Eckman, N., Saouaf, O. M., Jons, C. K., Pingali, S., Prossnitz, A. N., Kasse, C. M., Mai, D. J., Appel, E. A.
2026
- **Evolving Transport Properties of Dynamic Hydrogels Enable Self-Tuning of Short- and Long-Term Cargo Delivery.** *Journal of biomedical materials research. Part A*
Sen, S., Dong, C., Jons, C. K., Reineking, W., Alakesh, A., Eckman, N., Song, Y. E., Prossnitz, A. N., Appel, E. A.
2026; 114 (4): e70074
- **Long-Acting Hydrogel-Based Depot Formulations of Tirzepatide and Semaglutide for the Management of Type 2 Diabetes and Weight** *ADVANCED THERAPEUTICS*
d'Aquino, A. I., Dong, C., Nguyen, L. T., Yan, J., Jons, C. K., Saouaf, O. M., Song, Y., Eckman, N., Kapasi, S., Williams, C. M., Doulames, V., Sen, S., Manna, et al
2026; 9 (2)
- **Enabling global access to potent subunit vaccines with a simple and scalable injectable hydrogel platform.** *Biomaterials science*
Ganesh, P., Prossnitz, A. N., Jons, C. K., Eckman, N., Alakesh, A., Song, Y. E., Sen, S., Appel, E. A.
2025
- **Hydrogel formulations for sustained-release of broadly neutralizing antibodies.** *Journal of controlled release : official journal of the Controlled Release Society*
Jons, C. K., Kasse, C. M., Mayer, B. T., Hyrien, O., Sen, S., Meany, E. L., d'Aquino, A. I., Ganesh, P., Eckman, N., Dong, C., Yan, J., Nguyen, L. T., Doulames, et al
2025: 114349
- **Intranasal Sertraline for the Investigation of Nose-to-Brain Delivery to Mitigate Systemic Exposure.** *ACS pharmacology & translational science*
Williams, S. C., Lantz, T., Doulames, V., Alakesh, A., Ramos Mejia, D., Jons, C. K., Huang, Z. Y., Eckman, N., Appel, E. A.
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- **Ultrahigh-concentration biologic therapeutics enabled by spray drying with a glassy surfactant excipient.** *Science translational medicine*
Jons, C. K., Prossnitz, A. N., Eckman, N., Dong, C., Utz, A., Appel, E. A.
2025; 17 (812): eadv6427
- **Crosslink Dynamics Control Injection Force and Flow Profiles of Non-Covalent Gels** *MACROMOLECULES*
Eckman, N., Appel, E. A.
2025
- **Generation of an inflammatory niche in a hydrogel depot through recruitment of key immune cells improves efficacy of mRNA vaccines.** *Science advances*

Meany, E. L., Klich, J. H., Jons, C. K., Mao, T., Chaudhary, N., Utz, A., Baillet, J., Song, Y. E., Saouaf, O. M., Ou, B. S., Williams, S. C., Eckman, N., Irvine, et al

2025; 11 (15): eadr2631

- **Highly Extensible Physically Crosslinked Hydrogels for High-Speed 3D Bioprinting.** *Advanced healthcare materials*
Song, Y. E., Eckman, N., Sen, S., Jons, C. K., Saouaf, O. M., Appel, E. A.
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- **Crosslink strength governs yielding behavior in dynamically crosslinked hydrogels.** *Biomaterials science*
Eckman, N., Grosskopf, A. K., Jiang, G., Kamani, K., Huang, M. S., Schmittlein, B., Heilshorn, S. C., Rogers, S., Appel, E. A.
2025
- **A thiol-ene click-based strategy to customize injectable polymer-nanoparticle hydrogel properties for therapeutic delivery.** *Biomaterials science*
Bailey, S. J., Eckman, N., Brunel, E. S., Jons, C. K., Sen, S., Appel, E. A.
2025
- **Clonally expanded, targetable, natural killer-like NKG7 T cells seed the aged spinal cord to disrupt myeloid-dependent wound healing.** *Neuron*
Kong, G., Song, Y., Yan, Y., Calderazzo, S. M., Saddala, M. S., De Labastida Rivera, F., Cherry, J. D., Eckman, N., Appel, E. A., Velenosi, A., Swarup, V., Kawaguchi, R., Ng, et al
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- **Defining Structure-Function Relationships of Amphiphilic Excipients Enables Rational Design of Ultra-Stable Biopharmaceuticals.** *Advanced science (Weinheim, Baden-Wurtemberg, Germany)*
Prossnitz, A. N., Nguyen, L. T., Eckman, N., Borkar, S., Tetef, S., Autzen, A. A., Fuller, G. G., Appel, E. A.
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- **RGD-Modified Hydrogel Maintains Cell Growth in Mechanically-Induced Limbal Stem Cell Deficient Mouse Model**
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- **Biomaterials to enhance adoptive cell therapy** *NATURE REVIEWS BIOENGINEERING*
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- **Label-Free Composition Analysis of Supramolecular Polymer-Nanoparticle Hydrogels by Reversed-Phase Liquid Chromatography Coupled with a Charged Aerosol Detector.** *Analytical chemistry*
Tang, S., Pederson, Z., Meany, E. L., Yen, C., Swansiger, A. K., Prell, J. S., Chen, B., Grosskopf, A. K., Eckman, N., Jiang, G., Baillet, J., Pellett, J. D., Appel, et al
2024
- **A Regimen Compression Strategy for Commercial Vaccines Leveraging an Injectable Hydrogel Depot Technology for Sustained Vaccine Exposure** *ADVANCED THERAPEUTICS*
Yan, J., Ou, B. S. S., Saouaf, O. M. M., Meany, E. L. L., Eckman, N., Appel, E. A. A.
2023
- **A freely suspended robotic swimmer propelled by viscoelastic normal stresses** *JOURNAL OF FLUID MECHANICS*
Kroo, L. A., Binagia, J. P., Eckman, N., Prakash, M., Shaqfeh, E. S. G.
2022; 944
- **In Situ Direct Laser Writing of 3D Graphene-Laden Microstructures** *ADVANCED MATERIALS TECHNOLOGIES*
Restaino, M., Eckman, N., Alsharhan, A. T., Lamont, A. C., Anderson, J., Weinstein, D., Hall, A., Sochol, R. D.
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- **Ignition and combustion analysis of direct write fabricated aluminum/metal oxide/PVDF films** *COMBUSTION AND FLAME*
Rehwooldt, M. C., Wang, H., Kline, D. J., Wu, T., Eckman, N., Wang, P., Agrawal, N. R., Zachariah, M. R.
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- **Why does adding a poor thermal conductor increase propagation rate in solid propellants?** *APPLIED PHYSICS LETTERS*
Kline, D. J., Rehwooldt, M. C., Wang, H., Eckman, N. E., Zachariah, M. R.

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- **Direct Writing of a 90 wt% Particle Loading Nanothermite** *ADVANCED MATERIALS*

Wang, H., Shen, J., Kline, D. J., Eckman, N., Agrawal, N. R., Wu, T., Wang, P., Zachariah, M. R.

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