Stanford

Sarah Heilshorn

Rickey/Nielsen Professor in the School of Engineering and Professor, by courtesy, of Bioengineering and of Chemical Engineering

Materials Science and Engineering

NIH Biosketch available Online Curriculum Vitae available Online

CONTACT INFORMATION

- **Administrator**

  Naomi Tudor - Administrative Associate

  Email ntudor@stanford.edu

Bio

BIO

Heilshorn's interests include biomaterials in regenerative medicine, engineered proteins with novel assembly properties, microfluidics and photolithography of proteins, and synthesis of materials to influence stem cell differentiation. Current projects include tissue engineering for spinal cord and blood vessel regeneration, designing injectable materials for use in stem cell therapies, and the design of microfluidic devices to study the directed migration of cells (i.e., chemotaxis).

ACADEMIC APPOINTMENTS

- Professor, Materials Science and Engineering
- Professor (By courtesy), Chemical Engineering
- Professor (By courtesy), Bioengineering
- Member, Bio-X
- Member, Cardiovascular Institute
- Member, Wu Tsai Human Performance Alliance
- Member, Maternal & Child Health Research Institute (MCHRI)
- Affiliate, Precourt Institute for Energy
- Faculty Fellow, Sarafan ChEM-H
- Member, Stanford Cancer Institute
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- New Innovator Award, National Institutes of Health (2009)
- CAREER Award, National Science Foundation (2009)
- New Investigator Award, Petroleum Research Fund, American Chemical Society (2009)

PROFESSIONAL EDUCATION

- PhD, Caltech , Chemical Engineering (2004)

- MS, Caltech , Chemical Engineering (2000)
- BS, Georgia Tech , Chemical Engineering (1998)

LINKS

- Heilshorn Laboratory Site: https://web.stanford.edu/group/heilshorn/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Protein engineering

Tissue engineering

Regenerative medicine

Biomaterials

Teaching

COURSES

2025-26

- Biomaterials in Regenerative Medicine: BIOE 361, MATSCI 381 (Spr)

2024-25

- Bioengineering Materials to Heal the Body: MATSCI 81N (Spr)
- Introduction to Materials Science, Biomaterials Emphasis: ENGR 50M, MATSCI 50M (Aut)

2023-24

- Biomaterials in Regenerative Medicine: BIOE 361, MATSCI 381 (Spr)
- Introduction to Materials Science, Biomaterials Emphasis: ENGR 50M (Aut)

2022-23

- Bioengineering Materials to Heal the Body: MATSCI 81N (Spr)
- Introduction to Materials Science, Biomaterials Emphasis: ENGR 50M (Aut)
- Introductory Science of Materials: OSPBER 50M (Aut)
- Introductory Science of Materials: OSPFLOR 50M (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Lyla Dong, Andrea Flores Perez, Danielle Klinger, Zachary Montgomerie, Rachel SONG, Cindy Shi, Lucy Wang, Brendan Wirtz

Postdoctoral Faculty Sponsor

Fotios Christakopoulos, Carla Huerta Lopez, Dohui Kim, Jordan Moore, Avery Rui Sun

Doctoral Dissertation Advisor (AC)

Wendy Alwala, Naomi Alyafei, Neil Baugh, Jordan Bunch, Betty Cai, Seungheon Lee, Sofia Madrigal Gamboa, Esther Mozipo, Narelli Paiva, Diya Singhal, Tianming Yang, Daiyao Zhang

Master's Program Advisor

Stella Chung, Chrystalen Stambaugh

Doctoral Dissertation Co-Advisor (AC)

Anthony Han, Centaine Joseph, Becca Lau, Yee Lin Tan

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (Phd Program)
- Stem Cell Biology and Regenerative Medicine (Phd Program)

Publications

PUBLICATIONS

- **A diffusion-based 3D printing strategy to fabricate self-supporting, perfusable networks.** *BMC methods*
  Ramos Mejia, D., Cai, B., Iranzo, S. C., Perez, A., Tan, Y. L., Lee, S., Heilshorn, S. C.
  2026; 3 (1): 8
- **Expanding the Versatility of Dynamic Covalent Hydrogels with Static Covalent Spot-Welding** *CHEMISTRY OF MATERIALS*
  Huang, M. S., Navarro, R. S., Brunel, L. G., Narciso, N., Rodriguez, G., Baugh, N. J., Roth, J. G., Hull, S. M., Hubka, K. M., Heilshorn, S. C.
  2025
- **Polarized Distribution of Lipid Droplets with Long Acyl Chains and Unsaturation are Hallmarks of Human Intestinal Enteroid Differentiation.** *Analytical chemistry*
  Johansson, P. K., Liu, Y., Klett, K. C., Heilshorn, S. C., Enejder, A.
  2025
- **Guiding Multidirectional Collagen Fiber Alignment Through Extrusion-based 3D Printing for Cell Alignment**
  Singhal, D., Christakopoulos, F., Brunel, L. G., Myung, D., Fuller, G. G., Heilshorn, S. C.
  MARY ANN LIEBERT, INC.2025
- **Glioblastoma Cells Respond to Matrix Stress Relaxation Rate in Engineered 3D Viscoelastic Microenvironments**
  Ghorbani, S., Huang, M. S., Zhang, D., Liu, Y., Long, C., Zwetsloot, R. M., Rao, R., Heilshorn, S. C.
  MARY ANN LIEBERT, INC.2025
- **Dual-orientation of collagen fibers to guide cell alignment in 3D-printed constructs.** *Acta biomaterialia*
  Singhal, D., Christakopoulos, F., Brunel, L. G., Borkar, S., Doulames, V. M., Mozipo, E. A., Myung, D., Fuller, G. G., Heilshorn, S. C.
  2025
- **Tuning viscoelasticity of dynamic covalent hydrogels for human tissue modeling.** *bioRxiv : the preprint server for biology*
  Narciso, N. d., Christakopoulos, F., Huang, M. S., Baugh, N. J., Huerta-Lopez, C., Matos, E. X., Pashin, K. P., Spakowitz, A., Heilshorn, S. C.
  2025
- **Submucosal Hydrogel for Spring-Mediated Intestinal Lengthening.** *Journal of biomedical materials research. Part A*
  Salimi-Jazi, F., de Paiva Narciso, N., Fell, G., Thomas, A., Navarro, R. S., Rafeeqi, T., Baugh, N. J., Suhar, R. A., Nguyen, J., Lopez, N., Heilshorn, S. C., Dunn, J. C.
  2025; 113 (10): e37986
- **Targeting Cell-Matrix Induced Chemoresistance With Regorafenib in a 3D Model of Osteosarcoma.** *Journal of biomedical materials research. Part A*
  Rao, R. R., Huang, M. S., Zhang, D., Huerta-López, C., Long, C., Rodriguez, G. A., Mozipo, E. A., Sagi, S., Heilshorn, S. C.
  2025; 113 (9): e37985
- **Organoid bioprinting to pattern the matrix microenvironment** *CURRENT OPINION IN BIOMEDICAL ENGINEERING*
  Zhang, D., Huerta-Lopez, C., Heilshorn, S. C.
  2025; 35
- **Organoid bioprinting to pattern the matrix microenvironment.** *Current opinion in biomedical engineering*
  Zhang, D., Huerta-López, C., Heilshorn, S. C.
  2025; 35

- **Scalable production of human cortical organoids using a biocompatible polymer.** *Nature biomedical engineering*
  Narazaki, G., Miura, Y., Pavlov, S. D., Thete, M. V., Roth, J. G., Avar, M., Shin, S., Kim, J. I., Hudacova, Z., Heilshorn, S. C., Pașca, S. P.
  2025
- **Reinforcement of Fibrillar Collagen Hydrogels with Bioorthogonal Covalent Crosslinks.** *Biomacromolecules*
  Brunel, L. G., Long, C. M., Christakopoulos, F., Cai, B., de Paiva Narciso, N., Johansson, P. K., Singhal, D., Baugh, N. J., Zhang, D., Enejder, A., Myung, D., Heilshorn, S. C.
  2025
- **Viscoelastic N#cadherin-like interactions maintain neural progenitor cell stemness within 3D matrices.** *Nature communications*
  Huang, M. S., LeSavage, B. L., Ghorbani, S., Gilchrist, A. E., Roth, J. G., Huerta-López, C., Mozipo, E. A., Navarro, R. S., Heilshorn, S. C.
  2025; 16 (1): 5213
- **In situ UNIversal Orthogonal Network (UNION) bioink deposition for direct delivery of corneal stromal stem cells to corneal wounds.** *Bioactive materials*
  Brunel, L. G., Cai, B., Hull, S. M., Han, U., Wungcharoen, T., Fernandes-Cunha, G. M., Seo, Y. A., Johansson, P. K., Heilshorn, S. C., Myung, D.
  2025; 48: 414-430
- **Multidirectional alignment of collagen fibers to guide cell orientation in 3D-printed tissue.** *bioRxiv : the preprint server for biology*
  Singhal, D., Christakopoulos, F., Brunel, L. G., Borkar, S., Doulames, V. M., Myung, D., Fuller, G. G., Heilshorn, S. C.
  2025
- **Engineered Hydrogels for Organoid Models of Human Nonalcoholic Fatty Liver Disease.** *Advanced science (Weinheim, Baden-Wurttemberg, Germany)*
  Liu, Y., Gilchrist, A. E., Johansson, P. K., Guan, Y., Deras, J. D., Liu, Y., Ceva, S., Huang, M. S., Navarro, R. S., Enejder, A., Peltz, G., Heilshorn, S. C.
  2025: e17332
- **Osteopontin attenuates the foreign-body response to silicone implants.** *Nature biomedical engineering*
  Griffin, M. F., Parker, J. B., Tevlin, R., Liang, N. E., Valencia, C., Morgan, A., Kuhnert, M., Downer, M., Meany, E. L., Guo, J. L., Henn, D., Navarro, R. S., Shefren, et al
  2025
- **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
- **Bio-orthogonal crosslinking and hyaluronan facilitate transparent healing after treatment of deep corneal injuries with in situ-forming hydrogels.** *NPJ Regenerative medicine*
  Chen, F., Han, U., Wungcharoen, T., Seo, Y. A., Le, P., Jiang, L., Kang, N. W., Song, E., Jang, K., Mundy, D., Fernandes-Cunha, G. M., Heilshorn, S., Myung, et al
  2025; 10 (1): 8
- **One-step bioprinting of endothelialized, self-supporting arterial and venous networks.** *Biofabrication*
  Cai, B., Kilian, D., Ghorbani, S., Roth, J., Seymour, A. J., Brunel, L. G., Ramos Mejia, D., Rios, R. J., Szabo, I. M., Iranzo, S. C., Perez, A., Rao, R. R., Shin, et al
  2025
- **Interpenetrating networks of fibrillar and amorphous collagen promote cell spreading and hydrogel stability.** *Acta biomaterialia*
  Brunel, L. G., Long, C. M., Christakopoulos, F., Cai, B., Johansson, P. K., Singhal, D., Enejder, A., Myung, D., Heilshorn, S. C.
  2025
- **Cancer Organoids as reliable disease models to drive clinical development of novel therapies.** *Journal of experimental & clinical cancer research : CR*
  Blandino, G., Satchi-Fainaro, R., Tinhofer, I., Tonon, G., Heilshorn, S. C., Kwon, Y. J., Pestana, A., Frascolla, C., Pompili, L., Puce, A., Iachettini, S., Tocci, A., Karkampouna, et al
  2024; 43 (1): 334
- **Organoid bioprinting: from cells to functional tissues** *NATURE REVIEWS BIOENGINEERING*
  Huang, M. S., Christakopoulos, F., Roth, J. G., Heilshorn, S. C.
  2024

- **Live Cell Imaging of Human Liver Fibrosis using Hepatic Micro-Organoids.** *JCI insight*
  Guan, Y., Fang, Z., Hu, A., Roberts, S., Wang, M., Ren, W., Johansson, P. K., Heilshorn, S. C., Enejder, A., Peltz, G.
  2024
- **Cell tumbling enhances stem cell differentiation in hydrogels via nuclear mechanotransduction.** *Nature materials*
  Ayushman, M., Mikos, G., Tong, X., Sinha, S., Lopez-Fuentes, E., Jones, S., Cai, P. C., Lee, H. P., Morrison, A. J., Spakowitz, A., Heilshorn, S. C., Sweet-Cordero, A., Yang, et al
  2024
- **Photoactivated growth factor release from bio-orthogonally crosslinked hydrogels for the regeneration of corneal defects.** *Bioactive materials*
  Kang, N., Seo, Y. A., Jackson, K. J., Jang, K., Song, E., Han, U., Chen, F., Heilshorn, S. C., Myung, D.
  2024; 40: 417-429
- **Porosity dominates over microgel stiffness for promoting chondrogenesis in zwitterionic granular hydrogels.** *Biomaterials science*
  Asadikorayem, M., Brunel, L. G., Weber, P., Heilshorn, S. C., Zenobi-Wong, M.
  2024
- **In Situ UNIversal Orthogonal Network (UNION) Bioink Deposition for Direct Delivery of Corneal Stromal Stem Cells to Corneal Wounds.** *bioRxiv : the preprint server for biology*
  Brunel, L. G., Cai, B., Hull, S. M., Han, U., Wungcharoen, T., Fernandes-Cunha, G. M., Seo, Y. A., Johansson, P. K., Heilshorn, S. C., Myung, D.
  2024
- **Interpenetrating networks of fibrillar and amorphous collagen promote cell spreading and hydrogel stability.** *bioRxiv : the preprint server for biology*
  Brunel, L. G., Long, C. M., Christakopoulos, F., Cai, B., Johansson, P. K., Singhal, D., Enejder, A., Myung, D., Heilshorn, S. C.
  2024
- **Engineered Protein Hydrogels as Biomimetic Cellular Scaffolds.** *Advanced materials (Deerfield Beach, Fla.)*
  Liu, Y., Gilchrist, A. E., Heilshorn, S. C.
  2024: e2407794
- **The lysogenic filamentous Pseudomonas bacteriophage phage Pf slows mucociliary transport.** *PNAS nexus*
  Burgener, E. B., Cai, P. C., Kratochvil, M. J., Rojas-Hernandez, L. S., Joo, N. S., Gupta, A., Secor, P. R., Heilshorn, S. C., Spakowitz, A. J., Wine, J. J., Bollyky, P. L., Milla, C. E.
  2024; 3 (9): pgae390
- **In Situ-Forming, Bioorthogonally Cross-linked, Nanocluster-Reinforced Hydrogel for the Regeneration of Corneal Defects.** *ACS nano*
  Kang, N. W., Jang, K., Song, E., Han, U., Seo, Y. A., Chen, F., Wungcharoen, T., Heilshorn, S. C., Myung, D.
  2024
- **FIBRIN-BASED DELIVERY OF HEDGEHOG PATHWAY MODULATORS DURING NERVE REPAIR IN MOUSE MODELS OF NERVE INJURY**
  He, L., Cai, B., Ghorbani, S., Kilian, D., Bekale, L., Heilshorn, S., Pepper, J.
  WILEY.2024: S144
- **Combinatorial Hipsc-Neuron And Engineered Biomaterial Transplantation Therapy ToTreat Chronic Spinal Cord Injury**
  Doulames, V. M., Hefferon, M. E., Baugh, N. J., Suhar, R. A., Long, C. M., Palmer, T. D., Heilshorn, S. C.
  MARY ANN LIEBERT, INC.2024: S119
- **Engineered matrices reveal stiffness-mediated chemoresistance in patient-derived pancreatic cancer organoids.** *Nature materials*
  LeSavage, B. L., Zhang, D., Huerta-López, C., Gilchrist, A. E., Krajina, B. A., Karlsson, K., Smith, A. R., Karagyozova, K., Klett, K. C., Huang, M. S., Long, C., Kaber, G., Madl, et al
  2024
- **Air-liquid intestinal cell culture allows in situ rheological characterization of intestinal mucus.** *APL bioengineering*
  Cai, P. C., Braunreuther, M., Shih, A., Spakowitz, A. J., Fuller, G. G., Heilshorn, S. C.
  2024; 8 (2): 026112
- **Bio-Orthogonal Chemistry and Hyaluronan Enhance Corneal Restoration of Collagen Gel: 2-Month Response in Vivo**
  Chen, F., Han, U., Seo, Y., Heilshorn, S., Myung, D.

ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2024

- **Pf bacteriophages hinder sputum antibiotic diffusion via electrostatic binding.** *Science advances*
  Chen, Q., Cai, P., Chang, T. H., Burgener, E., Kratochvil, M. J., Gupta, A., Hargill, A., Secor, P. R., Nielsen, J. E., Barron, A. E., Milla, C., Heilshorn, S. C., Spakowitz, et al
  2024; 10 (22): eadl5576

- **Laminin-associated integrins mediate Diffuse Intrinsic Pontine Glioma infiltration and therapy response within a neural assembloid model.** *Acta neuropathologica communications*
  Sinha, S., Huang, M. S., Mikos, G., Bedi, Y., Soto, L., Lensch, S., Ayushman, M., Bintu, L., Bhutani, N., Heilshorn, S. C., Yang, F.
  2024; 12 (1): 71

- **Pf bacteriophages hinder sputum antibiotic diffusion via electrostatic binding.** *bioRxiv : the preprint server for biology*
  Chen, Q., Cai, P., Chang, T. H., Burgener, E., Kratochvil, M. J., Gupta, A., Hargil, A., Secor, P. R., Nielsen, J. E., Barron, A. E., Milla, C., Heilshorn, S. C., Spakowitz, et al
  2024

- **Diffusion-Based 3D Bioprinting Strategies.** *Advanced science (Weinheim, Baden-Wurttemberg, Germany)*
  Cai, B., Kilian, D., Ramos Mejia, D., Rios, R. J., Ali, A., Heilshorn, S. C.
  2023: e2306470

- **Embedded 3d Bioprinting of Collagen Inks into Microgel Baths to control hydrogel Microstructure and Cell Spreading.** *Advanced healthcare materials*
  Brunel, L. G., Christakopoulos, F., Kilian, D., Cai, B., Hull, S. M., Myung, D., Heilshorn, S. C.
  2023: e2303325

- **Gelation of Uniform Interfacial Diffusant in Embedded 3D Printing.** *Advanced functional materials*
  Shin, S., Brunel, L. G., Cai, B., Kilian, D., Roth, J. G., Seymour, A. J., Heilshorn, S. C.
  2023; 33 (50)

- **Rapid assessment of changes in phage bioactivity using dynamic light scattering.** *PNAS nexus*
  Dharmaraj, T., Kratochvil, M. J., Pourtois, J. D., Chen, Q., Hajfathalian, M., Hargil, A., Lin, Y. H., Evans, Z., Oromí-Bosch, A., Berry, J. D., McBride, R., Haddock, N. L., Holman, et al
  2023; 2 (12): pgad406

- **A Library of Elastin-like Proteins with Tunable Matrix Ligands for In Vitro 3D Neural Cell Culture.** *Biomacromolecules*
  Suhar, R. A., Huang, M. S., Navarro, R. S., Aviles Rodriguez, G., Heilshorn, S. C.
  2023

- **Custom-engineered hydrogels for delivery of human iPSC-derived neurons into the injured cervical spinal cord.** *Biomaterials*
  Doulames, V. M., Marquardt, L. M., Hefferon, M. E., Baugh, N. J., Suhar, R. A., Wang, A. T., Dubbin, K. R., Weimann, J. M., Palmer, T. D., Plant, G. W., Heilshorn, S. C.
  2023; 305: 122400

- **Cell Microencapsulation Within Engineered Hyaluronan Elastin-Like Protein (HELP) Hydrogels.** *Current protocols*
  Hefferon, M. E., Huang, M. S., Liu, Y., Navarro, R. S., de Paiva Narciso, N., Zhang, D., Aviles-Rodriguez, G., Heilshorn, S. C.
  2023; 3 (11): e917

- **Transient Competitors to Modulate Dynamic Covalent Cross-Linking of Recombinant Hydrogels** *CHEMISTRY OF MATERIALS*
  Gilchrist, A. E., Liu, Y., Klett, K., Liu, Y., Ceva, S., Heilshorn, S. C.
  2023

- **Tunable hydrogel viscoelasticity modulates human neural maturation.** *Science advances*
  Roth, J. G., Huang, M. S., Navarro, R. S., Akram, J. T., LeSavage, B. L., Heilshorn, S. C.
  2023; 9 (42): eadh8313

- **3D printing microporous scaffolds from modular bioinks containing sacrificial, cell-encapsulating microgels.** *Biomaterials science*
  Seymour, A. J., Kilian, D., Navarro, R. S., Hull, S. M., Heilshorn, S. C.
  2023

- **3D printing microporous scaffolds from modular bioinks containing sacrificial, cell-encapsulating microgels** *BIOMATERIALS SCIENCE*

Seymour, A. J., Kilian, D., Navarro, R. S., Hull, S. M., Heilshorn, S. C.
2023

- **Gelation of Uniform Interfacial Diffusant in Embedded 3D Printing** *ADVANCED FUNCTIONAL MATERIALS*
  Shin, S., Brunel, L. G., Cai, B., Kilian, D., Roth, J. G., Seymour, A. J., Heilshorn, S. C.
  2023
- **Spatially controlled construction of assembloids using bioprinting.** *Nature communications*
  Roth, J. G., Brunel, L. G., Huang, M. S., Liu, Y., Cai, B., Sinha, S., Yang, F., Pașca, S. P., Shin, S., Heilshorn, S. C.
  2023; 14 (1): 4346
- **Rapid assessment of changes in phage bioactivity using dynamic light scattering.** *bioRxiv : the preprint server for biology*
  Dharmaraj, T., Kratochvil, M. J., Pourtois, J. D., Chen, Q., Hajfathalian, M., Hargil, A., Lin, Y. H., Evans, Z., Oromí-Bosch, A., Berry, J. D., McBride, R., Haddock, N. L., Holman, et al
  2023
- **Design Parameters for Injectable Biopolymeric Hydrogels with Dynamic Covalent Chemistry Crosslinks.** *Advanced healthcare materials*
  Narciso, N. d., Navarro, R. S., Gilchrist, A., Trigo, M. L., Rodriguez, G. A., Heilshorn, S. C.
  2023: e2301265
- **3D Bioprinting Of Corneal-Cell Laden Inks As Bioengineered Corneal Substitutes**
  Brunel, L. G., Hull, S. M., Fernandes-Cunha, G., Johansson, P. K., Myung, D., Heilshorn, S. C.
  MARY ANN LIEBERT, INC.2023
- **Collagen Gels Crosslinked by Photoactivation of Riboflavin for the Repair and Regeneration of Corneal Defects.** *ACS applied bio materials*
  Fernandes-Cunha, G. M., Brunel, L. G., Arboleda, A., Manche, A., Seo, Y. A., Logan, C., Chen, F., Heilshorn, S. C., Myung, D.
  2023
- **Cell-matrix Interactions Mediate Chemosensitivity In A Tissue Engineered Model Of Osteosarcoma**
  Rao, R. R., Villa-Martin, B. C., Heilshorn, S. C.
  MARY ANN LIEBERT, INC.2023
- **Magnetized 3D Bioprinting To Construct Multi-Organoid Assembloids**
  Cai, B., Roth, J. G., Brunel, L. G., Huang, M. S., Liu, Y., Pasca, S., Shin, S., Heilshorn, S.
  MARY ANN LIEBERT, INC.2023
- **3D Bioprinting Of Corneal-Cell Laden Inks As Bioengineered Corneal Substitutes**
  Brunel, L. G., Hull, S. M., Fernandes-Cunha, G., Johansson, P. K., Myung, D., Heilshorn, S. C.
  MARY ANN LIEBERT, INC.2023
- **Human enteroids as a tool to study conventional and ultra-high dose rate radiation.** *Integrative biology : quantitative biosciences from nano to macro*
  Klett, K. C., Martin-Villa, B. C., Villarreal, V. S., Melemenidis, S., Viswanathan, V., Manjappa, R., Ashraf, M. R., Soto, L., Lau, B., Dutt, S., Rankin, E. B., Loo, B. W., Heilshorn, et al
  2023; 15
- **Gelation of Uniform Interfacial Diffusant in Embedded 3D Printing.** *bioRxiv : the preprint server for biology*
  Shin, S., Brunel, L. G., Cai, B., Kilian, D., Roth, J. G., Seymour, A. J., Heilshorn, S. C.
  2023
- **3D bioprinting of dynamic hydrogel bioinks enabled by small molecule modulators.** *Science advances*
  Hull, S. M., Lou, J., Lindsay, C. D., Navarro, R. S., Cai, B., Brunel, L. G., Westerfield, A. D., Xia, Y., Heilshorn, S. C.
  2023; 9 (13): eade7880
- **Elastin-like protein hydrogels with controllable stress relaxation rate and stiffness modulate endothelial cell function.** *Journal of biomedical materials research. Part A*
  Shayan, M., Huang, M. S., Navarro, R., Chiang, G., Hu, C., Oropeza, B. P., Johansson, P. K., Suhar, R. A., Foster, A. A., LeSavage, B. L., Zamani, M., Enejder, A., Roth, et al
  2023
- **Mobility mediates maturation: Synthetic substrates to enhance neural differentiation.** *Cell stem cell*

Roth, J. G., Huang, M. S., Heilshorn, S. C.
2023; 30 (2): 115-117

- **Tuning pro-survival effects of human induced pluripotent stem cell-derived exosomes using elastin-like polypeptides.** *Biomaterials*
  Lee, C., Hunt, D., Roth, J. G., Chiu, C., Suhar, R. A., LeSavage, B. L., Seymour, A. J., Lindsay, C., Krajina, B. A., Chen, Y., Chang, K., Hsieh, I., Chu, et al
  2022; 291: 121864
- **Rheological Characterization and Theoretical Modeling Establish Molecular Design Rules for Tailored Dynamically Associating Polymers.** *ACS central science*
  Cai, P. C., Su, B., Zou, L., Webber, M. J., Heilshorn, S. C., Spakowitz, A. J.
  2022; 8 (9): 1318-1327
- **Rheological Characterization and Theoretical Modeling Establish Molecular Design Rules for Tailored Dynamically Associating Polymers** *ACS CENTRAL SCIENCE*
  Cai, P. C., Su, B., Zou, L., Webber, M. J., Heilshorn, S. C., Spakowitz, A. J.
  2022
- **Engineering A Matrix To Improve Reproducibility Of Intestinal Organoids**
  Martin-Villa, B. C., Klett, K. C., Heilshorn, S. C.
  MARY ANN LIEBERT, INC.2022: 39-40
- **Biomimetic Hydrogels With Multi-component Cell Adhesive Ligands For Endothelial Cell Function**
  Shayan, M., Suhar, R., Heilshorn, S., Huang, N.
  MARY ANN LIEBERT, INC.2022: 36-37
- **Biochemical, biophysical, and immunological characterization of respiratory secretions in severe SARS-CoV-2 infections.** *JCI insight*
  Kratochvil, M. J., Kaber, G., Demirdjian, S., Cai, P. C., Burgener, E. B., Nagy, N., Barlow, G. L., Popescu, M., Nicolls, M. R., Ozawa, M. G., Regula, D. P., Pacheco-Navarro, A. E., Yang, et al
  2022; 7 (12)
- **Biocompatibility of photoactivated collagen-riboflavin hydrogels for corneal regeneration**
  Arboleda, A., Cunha, G., Manche, A., Seo, Y., Logan, C., Heilshorn, S. C., Myung, D.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022
- **Collagen hydrogels covalently crosslinked by bioorthogonal click chemistry resist cell-induced contraction while preserving encapsulated corneal stromal cell phenotype**
  Brunel, L. G., Hull, S. M., Johansson, P. K., Myung, D., Heilshorn, S. C.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022
- **Engineered assistive materials for 3D bioprinting: support baths and sacrificial inks.** *Biofabrication*
  Brunel, L. G., Hull, S. M., Heilshorn, S.
  2022
- **Hyaluronan and elastin-like protein (HELP) gels significantly improve microsphere retention in the myocardium.** *Biomaterials science*
  Suhar, R. A., Doulames, V. M., Liu, Y., Hefferon, M. E., Figueroa, O. 3., Buabbas, H., Heilshorn, S. C.
  2022
- **Tuning Polymer Hydrophilicity to Regulate Gel Mechanics and Encapsulated Cell Morphology.** *Advanced healthcare materials*
  Navarro, R. S., Huang, M. S., Roth, J. G., Hubka, K. M., Long, C. M., Enejder, A., Heilshorn, S. C.
  2022: e2200011
- **Biochemical, Biophysical, and Immunological Characterization of Respiratory Secretions in Severe SARS-CoV-2 (COVID-19) Infections.** *medRxiv : the preprint server for health sciences*
  Kratochvil, M. J., Kaber, G., Demirdjian, S., Cai, P. C., Burgener, E. B., Nagy, N., Barlow, G. L., Popescu, M., Nicolls, M. R., Ozawa, M. G., Regula, D. P., Pacheco-Navarro, A. E., Yang, et al
  2022
- **ENGINEERED BIOMIMETIC HYDROGELS WITH COMBINATORIAL CELL ADHESIVE LIGANDS FOR ANGIOGENESIS**
  Ngan Huang, Shayan, M., Suhar, R., Heilshorn, S. C.
  MARY ANN LIEBERT, INC.2022: S583

- **ADAPTABLE HYDROGELS FOR ORGANOID CULTURE**
  Heilshorn, S.
  MARY ANN LIEBERT, INC.2022: S280
- **SPATIALLY NANOPATTERNED SCAFFOLDS PROMOTE THE SURVIVAL OF INDUCED PLURIPOTENT STEM CELL-DERIVED ENDOTHELIAL CELLS IN THE ISCHEMIC LIMB**
  Huang, N., Yang, G., Alcazar, C., Hu, C., Zaitseva, T., Paukshto, M.
  MARY ANN LIEBERT, INC.2022: S583
- **Bioprinted microvasculature: progressing from structure to function.** *Biofabrication*
  Seymour, A. J., Westerfield, A. D., Cornelius, V. C., Skylar-Scott, M. A., Heilshorn, S.
  1800
- **A human multi-lineage hepatic organoid model for liver fibrosis.** *Nature communications*
  Guan, Y., Enejder, A., Wang, M., Fang, Z., Cui, L., Chen, S., Wang, J., Tan, Y., Wu, M., Chen, X., Johansson, P. K., Osman, I., Kunimoto, et al
  2021; 12 (1): 6138
- **3D Bioprinting of Cell-Laden Hydrogels for Improved Biological Functionality.** *Advanced materials (Deerfield Beach, Fla.)*
  Hull, S. M., Brunel, L. G., Heilshorn, S. C.
  2021: e2103691
- **Elastin-like Proteins to Support Peripheral Nerve Regeneration in Guidance Conduits.** *ACS biomaterials science & engineering*
  Suhar, R. A., Marquardt, L. M., Song, S., Buabbas, H., Doulames, V. M., Johansson, P. K., Klett, K. C., Dewi, R. E., Enejder, A. M., Plant, G. W., George, P. M., Heilshorn, S. C.
  2021; 7 (9): 4209-4220
- **Cancer-associated mesothelial cells promote ovarian cancer chemoresistance through paracrine osteopontin signaling.** *The Journal of clinical investigation*
  Qian, J., LeSavage, B. L., Hubka, K. M., Ma, C., Natarajan, S., Eggold, J. T., Xiao, Y., Fuh, K. C., Krishnan, V., Enejder, A., Heilshorn, S. C., Dorigo, O., Rankin, et al
  2021; 131 (16)
- **Next-generation cancer organoids.** *Nature materials*
  LeSavage, B. L., Suhar, R. A., Broguiere, N., Lutolf, M. P., Heilshorn, S. C.
  2021
- **Advancing models of neural development with biomaterials.** *Nature reviews. Neuroscience*
  Roth, J. G., Huang, M. S., Li, T. L., Feig, V. R., Jiang, Y., Cui, B., Greely, H. T., Bao, Z., Pasca, S. P., Heilshorn, S. C.
  2021
- **3D Printing of Microgel Scaffolds with Tunable Void Fraction to Promote Cell Infiltration.** *Advanced healthcare materials*
  Seymour, A. J., Shin, S., Heilshorn, S. C.
  2021: e2100644
- **Bio-orthogonally Crosslinked Matrix Therapies for Corneal Defect Repair**
  Myung, D., Chen, F., Fernandes-Cunha, G., Le, P., Hull, S., Heilshorn, S.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021
- **Physical Properties of COVID-19 Acute Respiratory Distress Syndrome (ARDS) Sputum**
  Pacheco-Navarro, A., Kratochvil, M. J., Kaber, G., Roque, J., Blish, C., Yang, S., Nadeau, K. C., Heilshorn, S. C., Milla, C. E., Rogers, A., Bollyky, P.
  AMER THORACIC SOC.2021
- **Engineered Matrices Enable the Culture of Human Patient-Derived Intestinal Organoids.** *Advanced science (Weinheim, Baden-Wurttemberg, Germany)*
  Hunt, D. R., Klett, K. C., Mascharak, S., Wang, H., Gong, D., Lou, J., Li, X., Cai, P. C., Suhar, R. A., Co, J. Y., LeSavage, B. L., Foster, A. A., Guan, et al
  2021; 8 (10): 2004705
- **Reconstructing the heart using iPSCs: Engineering strategies and applications.** *Journal of molecular and cellular cardiology*
  Cho, S., Lee, C., Skylar-Scott, M. A., Heilshorn, S. C., Wu, J. C.

2021

- **Engineered Matrices Enable the Culture of Human Patient-Derived Intestinal Organoids** *ADVANCED SCIENCE*
  Hunt, D. R., Klett, K. C., Mascharak, S., Wang, H. Y., Gong, D., Lou, J., Li, X., Cai, P. C., Suhar, R. A., Co, J. Y., LeSavage, B. L., Foster, A. A., Guan, et al
  2021

- **3D Bioprinting using UNIversal Orthogonal Network (UNION) Bioinks.** *Advanced functional materials*
  Hull, S. M., Lindsay, C. D., Brunel, L. G., Shiwarski, D. J., Tashman, J. W., Roth, J. G., Myung, D., Feinberg, A. W., Heilshorn, S. C.
  2021; 31 (7)

- **Microrheology reveals simultaneous cell-mediated matrix stiffening and fluidization that underlie breast cancer invasion.** *Science advances*
  Krajina, B. A., LeSavage, B. L., Roth, J. G., Zhu, A. W., Cai, P. C., Spakowitz, A. J., Heilshorn, S. C.
  2021; 7 (8)

- **Dynamic light scattering microrheology for soft and living materials.** *Soft matter*
  Cai, P. C., Krajina, B. A., Kratochvil, M. J., Zou, L., Zhu, A., Burgener, E. B., Bollyky, P. L., Milla, C. E., Webber, M. J., Spakowitz, A. J., Heilshorn, S. C.
  2021

- **Defined matrices bring IBD to 3D.** *Nature materials*
  LeSavage, B. L., Heilshorn, S. C.
  2021; 20 (2): 124–25

- **Transforming Growth Factor Induced Protein Promotes NF-Kappa-B Mediated Angiogenesis During Postnatal Lung Development.** *American journal of respiratory cell and molecular biology*
  Liu, M., Iosef, C., Rao, S., Domingo-Gonzalez, R., Fu, S., Snider, P., Conway, S. J., Umbach, G. S., Heilshorn, S. C., Dewi, R. E., Dahl, M. J., Null, D. M., Albertine, et al
  2020

- **3D Bioprinting using UNIversal Orthogonal Network (UNION) Bioinks** *ADVANCED FUNCTIONAL MATERIALS*
  Hull, S. M., Lindsay, C. D., Brunel, L. G., Shiwarski, D. J., Tashman, J. W., Roth, J. G., Myung, D., Feinberg, A. W., Heilshorn, S. C.
  2020

- **Neural Progenitor Cells Alter Chromatin Organization and Neurotrophin Expression in Response to 3D Matrix Degradability.** *Advanced healthcare materials*
  Madl, C. M., LeSavage, B. L., Khariton, M., Heilshorn, S. C.
  2020: e2000754

- **Bioengineered, In Situ-Crosslinked Collagen Gels for Suture-Free Stromal Defect Reconstruction of the Cornea**
  Myung, D., Djalilian, A. R., Heilshorn, S., Chen, F., Le, P., Hull, S., Fernandes-Cunha, G., Na, K.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2020

- **Designer, injectable gels to prevent transplanted Schwann cell loss during spinal cord injury therapy.** *Science advances*
  Marquardt, L. M., Doulames, V. M., Wang, A. T., Dubbin, K., Suhar, R. A., Kratochvil, M. J., Medress, Z. A., Plant, G. W., Heilshorn, S. C.
  2020; 6 (14): eaaz1039

- **Materials for blood brain barrier modeling in vitro.** *Materials science & engineering. R, Reports : a review journal*
  Ferro, M. P., Heilshorn, S. C., Owens, R. M.
  2020; 140

- **Materials for blood brain barrier modeling in vitro** *MATERIALS SCIENCE & ENGINEERING R-REPORTS*
  Ferro, M. P., Heilshorn, S. C., Owens, R. M.
  2020; 140

- **Engineering the Microenvironment for Heart Muscle Cell Mechanobiology**
  Castillo, E. A., Lane, K., Chirikian, O., Feinstein, S., Blair, C., Schroer, A., Pardon, G., Grancharova, T., Gunawardane, R., Heilshorn, S., Pruitt, B. L.
  CELL PRESS.2020: 154A

- **Bio-orthogonally crosslinked hyaluronate-collagen hydrogel for suture-free corneal defect repair.** *Biomaterials*
  Chen, F. n., Le, P. n., Fernandes-Cunha, G. M., Heilshorn, S. C., Myung, D. n.

2020; 255: 120176

- **Bioprinting Cell- and Spheroid-Laden Protein-Engineered Hydrogels as Tissue-on-Chip Platforms.** *Frontiers in bioengineering and biotechnology*
  Duarte Campos, D. F., Lindsay, C. D., Roth, J. G., LeSavage, B. L., Seymour, A. J., Krajina, B. A., Ribeiro, R. n., Costa, P. F., Blaeser, A. n., Heilshorn, S. C.
  2020; 8: 374

- **Weekly injection of IL-2 using an injectable hydrogel reduces autoimmune diabetes incidence in NOD mice.** *Diabetologia*
  Nagy, N. n., Kaber, G. n., Kratochvil, M. J., Kuipers, H. F., Ruppert, S. M., Yadava, K. n., Yang, J. n., Heilshorn, S. C., Long, S. A., Pugliese, A. n., Bollyky, P. L.
  2020

- **THE HYPOXIC TUMOR-MESOTHELIAL NICHE PROMOTES OVARIAN CANCER METASTASIS THROUGH COLLAGEN REMODELING**
  Natarajan, S., Foreman, K., Soriano, M., Shehade, H., Fregoso, D., Eggold, J., Rosen, N. S., Heilshorn, S., Krieg, A. J., Krishnan, V., Dorigo, O., Sinha, S., Fuh, et al
  AMER ASSOC CANCER RESEARCH.2019: 168

- **Rapid Diels-Alder Cross-linking of Cell Encapsulating Hydrogels** *CHEMISTRY OF MATERIALS*
  Madl, C. M., Heilshorn, S. C.
  2019; 31 (19): 8035–43

- **Rapid Diels-Alder Cross-linking of Cell Encapsulating Hydrogels.** *Chemistry of materials : a publication of the American Chemical Society*
  Madl, C. M., Heilshorn, S. C.
  2019; 31 (19): 8035-8043

- **Bioprinting of stem cell expansion lattices** *ACTA BIOMATERIALIA*
  Lindsay, C. D., Roth, J. G., LeSavage, B. L., Heilshorn, S. C.
  2019; 95: 225–35

- **Engineered materials for organoid systems.** *Nature reviews. Materials*
  Kratochvil, M. J., Seymour, A. J., Li, T. L., Paşca, S. P., Kuo, C. J., Heilshorn, S. C.
  2019; 4 (9): 606-622

- **Engineered materials for organoid systems** *NATURE REVIEWS MATERIALS*
  Kratochvil, M. J., Seymour, A. J., Li, T. L., Pasca, S. P., Kuo, C. J., Heilshorn, S. C.
  2019; 4 (9): 606–22

- **Adaptable protein-engineered hydrogels for organoid culture**
  Heilshorn, S.
  AMER CHEMICAL SOC.2019

- **Characterization of bioorthogonally crosslinked collagen gels with encapsulated corneal stromal stem cells**
  Hull, S., Fernandes-Cunha, G., Putra, I., Eslani, M., Djalilian, A. R., Heilshorn, S., Myung, D.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2019

- **Smart Bioinks as de novo Building Blocks to Bioengineer Living Tissues.** *Gels (Basel, Switzerland)*
  Blaeser, A., Heilshorn, S. C., Duarte Campos, D. F.
  2019; 5 (2)

- **Collagen Remodeling in the Hypoxic Tumor-Mesothelial Niche Promotes Ovarian Cancer Metastasis** *CANCER RESEARCH*
  Natarajan, S., Foreman, K. M., Soriano, M., Rossen, N. S., Shehade, H., Fregoso, D. R., Eggold, J. T., Krishnan, V., Dorigo, O., Krieg, A. J., Heilshorn, S. C., Sinha, S., Fuh, et al
  2019; 79 (9): 2271–84

- **Biomimetic polymers as custom bioinks for 3D printing**
  Heilshorn, S.
  AMER CHEMICAL SOC.2019

- **Matrix Remodeling Enhances the Differentiation Capacity of Neural Progenitor Cells in 3D Hydrogels** *ADVANCED SCIENCE*
  Madl, C. M., LeSavage, B. L., Dewi, R. E., Lampe, K. J., Heilshorn, S. C.

2019; 6 (4): 1801716

- **Adefinition of bioinks and their distinction from biomaterial inks** *BIOFABRICATION*
  Groll, J., Burdick, J. A., Cho, D., Derby, B., Gelinsky, M., Heilshorn, S. C., Juengst, T., Malda, J., Mironov, V. A., Nakayama, K., Ovsianikov, A., Sun, W., Takeuchi, et al
  2019; 11 (1): 013001

- **Antibiofilm elastin-like polypeptide coatings: functionality, stability, and selectivity** *ACTA BIOMATERIALIA*
  Atefyekta, S., Pihl, M., Lindsay, C., Heilshorn, S. C., Andersson, M.
  2019; 83: 245-256

- **Shear Thinning Hydrogel-based 3D Tissue Modelling** *BIOFABRICATION AND 3D TISSUE MODELING*
  Lindsay, C. D., Heilshorn, S. C.
  edited by Cho, D. W.
  2019; 3: 94–118

- **Bioprinting of stem cell expansion lattices.** *Acta biomaterialia*
  Lindsay, C. D., Roth, J. G., LeSavage, B. L., Heilshorn, S. C.
  2019

- **Antibiofilm elastin-like polypeptide coatings:#functionality, stability, and selectivity.** *Acta biomaterialia*
  Atefyekta, S., Pihl, M., Lindsay, C., Heilshorn, S. C., Andersson, M.
  2019; 83: 245–56

- **An in Vivo miRNA Delivery System for Restoring Infarcted Myocardium.** *ACS nano*
  Yang, H. n., Qin, X. n., Wang, H. n., Zhao, X. n., Liu, Y. n., Wo, H. T., Liu, C. n., Nishiga, M. n., Chen, H. n., Ge, J. n., Sayed, N. n., Abilez, O. J., Ding, et al
  2019

- **Interrogating extracellular matrix remodeling by breast cancer spheroids using dynamic light scattering microrheology.**
  Krajina, B. A., Zhu, A., Spakowitz, A. J., Heilshorn, S. C.
  AMER SOC CELL BIOLOGY.2018

- **Engineering Regenerative Thymic Tissues to Restore Long-Term T Cell Lymphopoiesis**
  Gai, H., Gras-Pena, R., Verma, Y., Fateh, V., Ikeda, K., Dejene, B., Min, D., Wang, J., Swigut, T., Weinberg, K. I., Hollander, G. A., Heilshorn, S., Roncarolo, et al
  AMER SOC HEMATOLOGY.2018

- **Tuning Bulk Hydrogel Degradation by Simultaneous Control of Proteolytic Cleavage Kinetics and Hydrogel Network Architecture.** *ACS macro letters*
  Madl, C. M., Katz, L. M., Heilshorn, S. C.
  2018; 7 (11): 1302-1307

- **Tuning Bulk Hydrogel Degradation by Simultaneous Control of Proteolytic Cleavage Kinetics and Hydrogel Network Architecture** *ACS MACRO LETTERS*
  Madl, C. M., Katz, L. M., Heilshorn, S. C.
  2018; 7 (11): 1302–7

- **Active DNA Olympic Hydrogels Driven by Topoisomerase Activity.** *Physical review letters*
  Krajina, B. A., Zhu, A., Heilshorn, S. C., Spakowitz, A. J.
  2018; 121 (14): 148001

- **Active DNA Olympic Hydrogels Driven by Topoisomerase Activity** *PHYSICAL REVIEW LETTERS*
  Krajina, B. A., Zhu, A., Heilshorn, S. C., Spakowitz, A. J.
  2018; 121 (14)

- **Engineered stem cell mimics to enhance stroke recovery** *BIOMATERIALS*
  George, P. M., Oh, B., Dewi, R., Hua, T., Cai, L., Levinson, A., Liang, X., Krajina, B. A., Bliss, T. M., Heilshorn, S. C., Steinberg, G. K.
  2018; 178: 63–72

- **Polymers at the Interface with Biology** *BIOMACROMOLECULES*

Deming, T. J., Klok, H., Armes, S. P., Becker, M. L., Champion, J. A., Chen, E., Heilshorn, S. C., van Hest, J. C. M., Irvine, D. J., Johnson, J. A., Kiessling, L. L., Maynard, H. D., de la Cruz, et al
2018; 19 (8): 3151–62

- **Tunable Control of Hydrogel Microstructure by Kinetic Competition between Self-Assembly and Crosslinking of Elastin-like Proteins** *ACS APPLIED MATERIALS & INTERFACES*
  Wang, H., Paul, A., Duong Nguyen, Enejder, A., Heilshorn, S. C.
  2018; 10 (26): 21808–15
- **Investigating the interplay between substrate stiffness and ligand chemistry in directing mesenchymal stem cell differentiation within 3D macro-porous substrates.** *Biomaterials*
  Haugh, M. G., Vaughan, T. J., Madl, C. M., Raftery, R. M., McNamara, L. M., O'Brien, F. J., Heilshorn, S. C.
  2018; 171: 23–33
- **Investigating the interplay between substrate stiffness and ligand chemistry in directing mesenchymal stem cell differentiation within 3D macro-porous substrates** *BIOMATERIALS*
  Haugh, M. G., Vaughan, T. J., Madl, C. M., Raftery, R. M., McNamara, L. M., O'Brien, F. J., Heilshorn, S. C.
  2018; 171: 23-33
- **Effects of engineered cellular microenvironments on the secretome of human mesenchymal stem cells**
  Hull, S., Fernandes-Cunha, G., Lee, H., Heilshorn, S., Myung, D.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2018
- **Mechanical properties of collagen gels crosslinked by copper-free click chemistry and their effects on encapsulated keratocytes**
  Lee, H., Fernandes-Cunha, G., Heilshorn, S., Myung, D.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2018
- **Engineering Hydrogel Microenvironments to Recapitulate the Stem Cell Niche.** *Annual review of biomedical engineering*
  Madl, C. M., Heilshorn, S. C.
  2018; 20: 21–47
- **Review: Bioengineering strategies to probe T cell mechanobiology.** *APL bioengineering*
  de la Zerda, A., Kratochvil, M. J., Suhar, N. A., Heilshorn, S. C.
  2018; 2 (2): 021501
- **Review: Bioengineering strategies to probe T cell mechanobiology** *APL BIOENGINEERING*
  de la Zerda, A., Kratochvil, M. J., Suhar, N. A., Heilshorn, S. C.
  2018; 2 (2)
- **Dynamic Hyaluronan Hydrogels with Temporally Modulated High Injectability and Stability Using a Biocompatible Catalyst** *ADVANCED MATERIALS*
  Lou, J., Liu, F., Lindsay, C. D., Chaudhuri, O., Heilshorn, S. C., Xia, Y.
  2018; 30 (22)
- **Production of Elastin-like Protein Hydrogels for Encapsulation and Immunostaining of Cells in 3D.** *Journal of visualized experiments : JoVE*
  LeSavage, B. L., Suhar, N. A., Madl, C. M., Heilshorn, S. C.
  2018
- **Bioengineering strategies to accelerate stem cell therapeutics** *NATURE*
  Madl, C. M., Heilshorn, S. C., Blau, H. M.
  2018; 557 (7705): 335–42
- **Dynamic Hyaluronan Hydrogels with Temporally Modulated High Injectability and Stability Using a Biocompatible Catalyst.** *Advanced materials (Deerfield Beach, Fla.)*
  Lou, J., Liu, F., Lindsay, C. D., Chaudhuri, O., Heilshorn, S. C., Xia, Y.
  2018; 30 (22): e1705215
- **Production of Elastin-like Protein Hydrogels for Encapsulation and Immunostaining of Cells in 3D** *JOVE-JOURNAL OF VISUALIZED EXPERIMENTS*
  LeSavage, B. L., Suhar, N. A., Madl, C. M., Heilshorn, S. C.
  2018

- **Protein engineering of multi-functional biomaterials for regenerative medicine**
  Heilshorn, S.
  AMER CHEMICAL SOC.2018
- **Bioorthogonal Strategies for Engineering Extracellular Matrices** *ADVANCED FUNCTIONAL MATERIALS*
  Madl, C. M., Heilshorn, S. C.
  2018; 28 (11)
- **Bioorthogonal Strategies for Engineering Extracellular Matrices.** *Advanced functional materials*
  Madl, C. M., Heilshorn, S. C.
  2018; 28 (11)
- **Protein-engineered hydrogels enhance the survival of induced pluripotent stem cell-derived endothelial cells for treatment of peripheral arterial disease** *BIOMATERIALS SCIENCE*
  Foster, A. A., Dewi, R. E., Cai, L., Hou, L., Strassberg, Z., Alcazar, C. A., Heilshorn, S. C., Huang, N. F.
  2018; 6 (3): 614–22
- **Interrogating Cell-Mediated Remodeling of the Extracellular Matrix by Dynamic Light Scattering Microrheology**
  Krajina, B. A., Zhu, A., Heilshorn, S. C., Spakowitz, A. J.
  CELL PRESS.2018: 371A–372A
- **Engineered stem cell mimics to enhance stroke recovery.** *Biomaterials*
  George, P. M., Oh, B. n., Dewi, R. n., Hua, T. n., Cai, L. n., Levinson, A. n., Liang, X. n., Krajina, B. A., Bliss, T. M., Heilshorn, S. C., Steinberg, G. K.
  2018; 178: 63–72
- **Engineering Hydrogel Microenvironments to Recapitulate the Stem Cell Niche** *ANNUAL REVIEW OF BIOMEDICAL ENGINEERING, VOL 20*
  Madl, C. M., Heilshorn, S. C.
  edited by Yamush, M. L.
  2018; 20: 21-47
- **Biotemplated synthesis of inorganic materials: An emerging paradigm for nanomaterial synthesis inspired by nature** *PROGRESS IN MATERIALS SCIENCE*
  Krajina, B. A., Proctor, A. C., Schoen, A. P., Spakowitz, A. J., Heilshorn, S. C.
  2018; 91: 1–23
- **Dynamic Light Scattering Microrheology Reveals Multiscale Viscoelasticity of Polymer Gels and Precious Biological Materials** *ACS CENTRAL SCIENCE*
  Krajina, B. A., Tropini, C., Zhu, A., DiGiacomo, P., Sonnenburg, J. L., Heilshorn, S. C., Spakowitz, A. J.
  2017; 3 (12): 1294–1303
- **Adaptable hydrogels with secondary reinforcement for regenerative medicine**
  Heilshorn, S., Wang, H.
  AMER CHEMICAL SOC.2017
- **Recombinant biomaterials for treatment of spinal cord injuries**
  Dubbin, K., Marquardt, L., Plant, G., Heilshorn, S.
  AMER CHEMICAL SOC.2017
- **Peptide-crosslinking of biomaterials for 3D bio-printing**
  Heilshorn, S., Dubbin, K.
  AMER CHEMICAL SOC.2017
- **Polypeptide scaffolds as engineered neural stem cell niches**
  Madl, C., Heilshorn, S.
  AMER CHEMICAL SOC.2017
- **Covalently adaptable elastin-like protein - hyaluronic acid (ELP - HA) hybrid hydrogels with secondary thermoresponsive crosslinking for injectable stem cell delivery.** *Advanced functional materials*
  Wang, H., Zhu, D., Paul, A., Cai, L., Enejder, A., Yang, F., Heilshorn, S. C.
  2017; 27 (28)

- **Covalently Adaptable Elastin-Like Protein-Hyaluronic Acid (ELP-HA) Hybrid Hydrogels with Secondary Thermoresponsive Crosslinking for Injectable Stem Cell Delivery** *ADVANCED FUNCTIONAL MATERIALS*
  Wang, H., Zhu, D., Paul, A., Cai, L., Enejder, A., Yang, F., Heilshorn, S. C.
  2017; 27 (28)

- **A novel protein-engineered hepatocyte growth factor analog released via a shear-thinning injectable hydrogel enhances post-infarction ventricular function.** *Biotechnology and bioengineering*
  Steele, A. N., Cai, L., Truong, V. N., Edwards, B. B., Goldstone, A. B., Eskandari, A., Mitchell, A. C., Marquardt, L. M., Foster, A. A., Cochran, J. R., Heilshorn, S. C., Woo, Y. J.
  2017

- **Improvement of paracellular transport in the Caco-2 drug screening model using protein-engineered substrates** *BIOMATERIALS*
  Dimarco, R. L., Hunt, D. R., Dewi, R. E., Heilshorn, S. C.
  2017; 129: 152-162

- **Novel approaches to anchoring therapeutic factors to corneal stroma to promote wound healing.**
  Myung, D., Djalilian, A. R., Heilshorn, S., Goldberg, J. L., Kreymerman, A., Kumar, A., Madl, C., Eslani, M., Shen, X., Putra, I., Fernandes-Cunha, G., Koh, W., Lee, et al
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2017

- **Dynamic Rheology for the Prediction of Surgical Outcomes in Autologous Fat Grafting.** *Plastic and reconstructive surgery*
  Luan, A., Zielins, E. R., Wearda, T., Atashroo, D. A., Blackshear, C. P., Raphel, J., Brett, E. A., Flacco, J., Alyono, M. C., Momeni, A., Heilshorn, S., Longaker, M. T., Wan, et al
  2017

- **Protein-Nanoparticle Hydrogels That Self-assemble in Response to Peptide-Based Molecular Recognition.** *ACS biomaterials science & engineering*
  Parisi-Amon, A., Lo, D. D., Montoro, D. T., Dewi, R. E., Longaker, M. T., Heilshorn, S. C.
  2017; 3 (5): 750-756

- **Protein-Nanoparticle Hydrogels That Self-assemble in Response to Peptide-Based Molecular Recognition** *ACS BIOMATERIALS SCIENCE & ENGINEERING*
  Parisi-Amon, A., Lo, D. D., Montoro, D. T., Dew, R. E., Longaker, M. T., Heilshorn, S. C.
  2017; 3 (5): 750-756

- **Elastin-like protein-hyaluronic acid (ELP-HA) hydrogels with decoupled mechanical and biochemical cues for cartilage regeneration.** *Biomaterials*
  Zhu, D., Wang, H., Trinh, P., Heilshorn, S. C., Yang, F.
  2017

- **Tyrosine-Selective Functionalization for Bio-Orthogonal Cross-Linking of Engineered Protein Hydrogels.** *Bioconjugate chemistry*
  Madl, C. M., Heilshorn, S. C.
  2017

- **YAP-dependent mechanotransduction is required for proliferation and migration on native-like substrate topography** *BIOMATERIALS*
  Mascharak, S., Benitez, P. L., Proctor, A. C., Madl, C. M., Hu, K. H., Dewi, R. E., Butte, M. J., Heilshorn, S. C.
  2017; 115: 155-166

- **Hyaluronan content governs tissue stiffness in pancreatic islet inflammation.** *The Journal of biological chemistry*
  Nagy, N. n., de la Zerda, A. n., Kaber, G. n., Johnson, P. Y., Hu, K. H., Kratochvil, M. J., Yadava, K. n., Zhao, W. n., Cui, Y. n., Navarro, G. n., Annes, J. P., Wight, T. N., Heilshorn, et al
  2017

- **Photoacoustic Imaging of Embryonic Stem Cell-Derived Cardiomyocytes in Living Hearts with Ultrasensitive Semiconducting Polymer Nanoparticles** *Advanced Functional Materials*
  Qin, X., Chen, H., Yang, H., Wu, H., Zhao, X., Wang, H., Chour, T., Neofytou, E., Ding, D., Daldrup-Link, H., Heilshorn, S. C., Li, K., Wu, et al
  2017

- **The Diverse Roles of Hydrogel Mechanics in Injectable Stem Cell Transplantation.** *Current opinion in chemical engineering*
  Foster, A. A., Marquardt, L. M., Heilshorn, S. C.
  2017; 15: 15–23

- **Immobilization of growth factors to collagen surfaces using visible light.** *Biomacromolecules*
  Fernandes Cunha, G. M., Lee, H. J., Kumar, A. n., Kreymerman, A. n., Heilshorn, S. C., Myung, D. n.
  2017
- **Quantitative criteria to benchmark new and existing bio-inks for cell compatibility.** *Biofabrication*
  Dubbin, K. n., Tabet, A. n., Heilshorn, S. C.
  2017; 9 (4): 044102
- **Micro- and nano-patterned elastin-like polypeptide hydrogels for stem cell culture.** *Soft matter*
  Paul, A. n., Stührenberg, M. n., Chen, S. n., Rhee, D. n., Lee, W. K., Odom, T. W., Heilshorn, S. C., Enejder, A. n.
  2017; 13 (34): 5665–75
- **Maintenance of neural progenitor cell stemness in 3D hydrogels requires matrix remodelling.** *Nature materials*
  Madl, C. M., LeSavage, B. L., Dewi, R. E., Dinh, C. B., Stowers, R. S., Khariton, M. n., Lampe, K. J., Nguyen, D. n., Chaudhuri, O. n., Enejder, A. n., Heilshorn, S. C.
  2017; 16 (12): 1233–42
- **Regulating Stem Cell Secretome Using Injectable Hydrogels with In Situ Network Formation.** *Advanced healthcare materials*
  Cai, L., Dewi, R. E., Goldstone, A. B., Cohen, J. E., Steele, A. N., Woo, Y. J., Heilshorn, S. C.
  2016
- **Dual-Stage Crosslinking of a Gel-Phase Bioink Improves Cell Viability and Homogeneity for 3D Bioprinting.** *Advanced healthcare materials*
  Dubbin, K., Hori, Y., Lewis, K. K., Heilshorn, S. C.
  2016; 5 (19): 2488-2492
- **Probing the Metabolomics of Stem Cell Differentiation with Biomaterials** *CHEM*
  Madl, C. M., Heilshorn, S. C.
  2016; 1 (2): 192-+
- **Integrating concepts of material mechanics, ligand chemistry, dimensionality and degradation to control differentiation of mesenchymal stem cells** *CURRENT OPINION IN SOLID STATE & MATERIALS SCIENCE*
  Haugh, M. G., Heilshorn, S. C.
  2016; 20 (4): 171-179
- **Integrating Concepts of Material Mechanics, Ligand Chemistry, Dimensionality and Degradation to Control Differentiation of Mesenchymal Stem Cells.** *Current opinion in solid state & materials science*
  Haugh, M. G., Heilshorn, S. C.
  2016; 20 (4): 171-179
- **An artificial niche preserves the quiescence of muscle stem cells and enhances their therapeutic efficacy.** *Nature biotechnology*
  Quarta, M., Brett, J. O., DiMarco, R., de Morree, A., Boutet, S. C., Chacon, R., Gibbons, M. C., Garcia, V. A., Su, J., Shrager, J. B., Heilshorn, S., Rando, T. A.
  2016; 34 (7): 752-759
- **Bio-Orthogonally Crosslinked, Engineered Protein Hydrogels with Tunable Mechanics and Biochemistry for Cell Encapsulation** *ADVANCED FUNCTIONAL MATERIALS*
  Madl, C. M., Katz, L. M., Heilshorn, S. C.
  2016; 26 (21): 3612-3620
- **Bio-Orthogonally Crosslinked, Engineered Protein Hydrogels with Tunable Mechanics and Biochemistry for Cell Encapsulation.** *Advanced functional materials*
  Madl, C. M., Katz, L. M., Heilshorn, S. C.
  2016; 26 (21): 3612-3620
- **Multifunctional coatings to simultaneously promote osseointegration and prevent infection of orthopaedic implants.** *Biomaterials*
  Raphel, J., Holodniy, M., Goodman, S. B., Heilshorn, S. C.
  2016; 84: 301-314
- **A Comparative Study of Collagen Matrix Density Effect on Endothelial Sprout Formation Using Experimental and Computational Approaches** *ANNALS OF BIOMEDICAL ENGINEERING*
  Shamloo, A., Mohammadaliha, N., Heilshorn, S. C., Bauer, A. L.

2016; 44 (4): 929-941

- **Engineered protein coatings to improve the osseointegration of dental and orthopaedic implants.** *Biomaterials*
  Raphel, J., Karlsson, J., Galli, S., Wennerberg, A., Lindsay, C., Haugh, M. G., Pajarinen, J., Goodman, S. B., Jimbo, R., Andersson, M., Heilshorn, S. C.
  2016; 83: 269-282

- **Use of protein-engineered fabrics to identify design rules for integrin ligand clustering in biomaterials** *INTEGRATIVE BIOLOGY*
  Benitez, P. L., Mascharak, S., Proctor, A. C., Heilshorn, S. C.
  2016; 8 (1): 50-61

- **Use of protein-engineered fabrics to identify design rules for integrin ligand clustering in biomaterials.** *Integrative biology : quantitative biosciences from nano to macro*
  Benitez, P. L., Mascharak, S., Proctor, A. C., Heilshorn, S. C.
  2016; 8 (1): 50-61

- **Design of Injectable Materials to Improve Stem Cell Transplantation.** *Current stem cell reports*
  Marquardt, L. M., Heilshorn, S. C.
  2016; 2 (3): 207–20

- **Injectable, Covalently Adaptable Hydrogels with Secondary Thermoresponsive Reinforcement for Cartilage Engineering**
  Wang, H., Zhu, D., Yang, F., Heilshorn, S. C.
  MARY ANN LIEBERT, INC.2015: S253

- **Injectable Hydrogels with Double Network Formation to Promote Angiogenesis**
  Cai, L., Heilshorn, S.
  MARY ANN LIEBERT, INC.2015: S131

- **Hybrid Elastin-like Polypeptide-Polyethylene Glycol Hydrogels for 3D Cell Culture with Tunable Matrix Stiffness and Cell Ligand Density**
  Wang, H., Cai, L., Paul, A., Enejder, A., Heilshorn, S. C.
  MARY ANN LIEBERT, INC.2015: S308–S309

- **Injectable Hydrogels to Deliver and Engraft Schwann Cells in Spinal Cord Lesions**
  Dubbin, K., Cai, L., Madl, C., Marquardt, L., Plant, G., Heilshorn, S.
  MARY ANN LIEBERT, INC.2015: S81

- **Design of Self-assembling Bio-inks for Cell-based 3d Printing**
  Dubbin, K., Hori, Y., Pimienta, R., Heilshorn, S.
  MARY ANN LIEBERT, INC.2015: S41-S42

- **Matrix Remodeling Regulates Neural Progenitor Cell Phenotype in Engineered Elastin-Like Protein Hydrogels**
  Madl, C. M., Lampe, K. J., Heilshorn, S. C.
  MARY ANN LIEBERT, INC.2015: S150

- **An Experimental and Computational Investigation of 3D Matrix Mechanics in Directing Stem Cell Lineage**
  Haugh, M. G., Vaughan, T. J., McNamara, L. M., O'Brien, F. J., Heilshorn, S. C.
  MARY ANN LIEBERT, INC.2015: S300

- **Adaptable Hydrogel Networks with Reversible Linkages for Tissue Engineering** *ADVANCED MATERIALS*
  Wang, H., Heilshorn, S. C.
  2015; 27 (25): 3717-3736

- **Matrix interactions modulate neurotrophin-mediated neurite outgrowth and pathfinding** *NEURAL REGENERATION RESEARCH*
  Madl, C. M., Heilshorn, S. C.
  2015; 10 (4): 514-517

- **Injectable Hydrogels with In Situ Double Network Formation Enhance Retention of Transplanted Stem Cells** *ADVANCED FUNCTIONAL MATERIALS*
  Cai, L., Dewi, R. E., Heilshorn, S. C.
  2015; 25 (9): 1344-1351

- **Injectable Hydrogels with In Situ Double Network Formation Enhance Retention of Transplanted Stem Cells.** *Advanced functional materials*
  Cai, L., Dewi, R. E., Heilshorn, S. C.
  2015; 25 (9): 1344-1351
- **Protein-engineered hydrogel encapsulation for 3-d culture of murine cochlea.** *Otology & neurotology*
  Chang, D. T., Chai, R., DiMarco, R., Heilshorn, S. C., Cheng, A. G.
  2015; 36 (3): 531-538
- **Microfluidic Gradients Reveal Enhanced Neurite Outgrowth but Impaired Guidance within 3D Matrices with High Integrin Ligand Densities** *SMALL*
  Romano, N. H., Lampe, K. J., Xu, H., Ferreira, M. M., Heilshorn, S. C.
  2015; 11 (6): 722-730
- **Matrix RGD ligand density and L1CAM-mediated Schwann cell interactions synergistically enhance neurite outgrowth.** *Acta biomaterialia*
  Romano, N. H., Madl, C. M., Heilshorn, S. C.
  2015; 11: 48-57
- **Protein-engineered scaffolds for in vitro 3D culture of primary adult intestinal organoids** *BIOMATERIALS SCIENCE*
  Dimarco, R. L., Dewi, R. E., Bernal, G., Kuoc, C., Heilshorn, S. C.
  2015; 3 (10): 1376-1385
- **Microfluidic analysis of extracellular matrix-bFGF crosstalk on primary human myoblast chemoproliferation, chemokinesis, and chemotaxis** *INTEGRATIVE BIOLOGY*
  Ferreira, M. M., Dewi, R. E., Heilshorn, S. C.
  2015; 7 (5): 569-579
- **Multi-Site Functionalization of Protein Scaffolds for Bimetallic Nanoparticle Templating** *ADVANCED FUNCTIONAL MATERIALS*
  Huggins, K. N., Schoen, A. P., Arunagirinathan, M. A., Heilshorn, S. C.
  2014; 24 (48): 7737-7744
- **Dual-stage growth factor release within 3D protein-engineered hydrogel niches promotes adipogenesis.** *Biomaterials science*
  Greenwood-Goodwin, M., Teasley, E. S., Heilshorn, S. C.
  2014; 2 (11): 1627-1639
- **Avidity-controlled hydrogels for injectable co-delivery of induced pluripotent stem cell-derived endothelial cells and growth factors.** *Journal of controlled release*
  Mulyasasmita, W., Cai, L., Dewi, R. E., Jha, A., Ullmann, S. D., Luong, R. H., Huang, N. F., Heilshorn, S. C.
  2014; 191: 71-81
- **Hybrid elastin-like polypeptide-polyethylene glycol (ELP-PEG) hydrogels with improved transparency and independent control of matrix mechanics and cell ligand density.** *Biomacromolecules*
  Wang, H., Cai, L., Paul, A., Enejder, A., Heilshorn, S. C.
  2014; 15 (9): 3421-3428
- **Hybrid Elastin-like Polypeptide-Polyethylene Glycol (ELP-PEG) Hydrogels with Improved Transparency and Independent Control of Matrix Mechanics and Cell Ligand Density** *BIOMACROMOLECULES*
  Wang, H., Cai, L., Paul, A., Enejder, A., Heilshorn, S. C.
  2014; 15 (9): 3421-3428
- **The Optimal Fat Graft: Evaluating the Biomechanical Effects of Diameter, Length, and Flow Rate during Fat Placement**
  Atashroo, D., Wearda, T., Raphel, J., Paik, K., Zielins, E. R., Walmsley, G. G., Tevlin, R., Wan, D. C., Heilshorn, S., Longaker, M. T.
  ELSEVIER SCIENCE INC.2014: S90
- **Injectable hydrogels with in situ double network formation for cell transplantation**
  Cai, L., Heilshorn, S.
  AMER CHEMICAL SOC.2014
- **Self-assembled protein cages as nanoreactors for inorganic nanomaterials synthesis**
  Heilshorn, S.
  AMER CHEMICAL SOC.2014

- **Avidity-controlled delivery of angiogenic peptides from injectable molecular-recognition hydrogels.** *Tissue engineering. Part A*
  Mulyasasmita, W., Cai, L., Hori, Y., Heilshorn, S. C.
  2014; 20 (15-16): 2102-2114
- **Rheology and simulation of 2-dimensional clathrin protein network assembly.** *Soft matter*
  VanDersarl, J. J., Mehraeen, S., Schoen, A. P., Heilshorn, S. C., Spakowitz, A. J., Melosh, N. A.
  2014; 10 (33): 6219-6227
- **Small-molecule axon-polarization studies enabled by a shear-free microfluidic gradient generator.** *Lab on a chip*
  Xu, H., Ferreira, M. M., Heilshorn, S. C.
  2014; 14 (12): 2047-2056
- **One-pot Synthesis of Elastin-like Polypeptide Hydrogels with Grafted VEGF-Mimetic Peptides.** *Biomaterials science*
  Cai, L., Dinh, C. B., Heilshorn, S. C.
  2014; 2 (5): 757-765
- **Designing ECM-mimetic materials using protein engineering** *ACTA BIOMATERIALIA*
  Cai, L., Heilshorn, S. C.
  2014; 10 (4): 1751-1760
- **Injectable materials for co-delivery of stem cells and nanoparticles**
  Heilshorn, S. C.
  AMER CHEMICAL SOC.2014
- **Engineering of three-dimensional microenvironments to promote contractile behavior in primary intestinal organoids.** *Integrative biology*
  Dimarco, R. L., Su, J., Yan, K. S., Dewi, R., Kuo, C. J., Heilshorn, S. C.
  2014; 6 (2): 127-142
- **Presentation of BMP-2 Mimicking Peptides in 3D Hydrogels Directs Cell Fate Commitment in Osteoblasts and Mesenchymal Stem Cells** *BIOMACROMOLECULES*
  Madl, C. M., Mehta, M., Duda, G. N., Heilshorn, S. C., Mooney, D. J.
  2014; 15 (2): 445-455
- **A microfluidic-based genetic screen to identify microbial virulence factors that inhibit dendritic cell migration** *INTEGRATIVE BIOLOGY*
  McLaughlin, L. M., Xu, H., Carden, S. E., Fisher, S., Reyes, M., Heilshorn, S. C., Monack, D. M.
  2014; 6 (4): 438-449
- **Recombinant Protein Hydrogels for Cell Injection and Transplantation** *HYDROGELS IN CELL-BASED THERAPIES*
  Benitez, P. L., Heilshorn, S. C.
  edited by Connon, C. J., Hamley, I. W.
  2014; 2: 48-72
- **Biological biomaterials structure, function, property design across the molecular-nano-micro-macro scales.** *Acta biomaterialia*
  Barker, T. H., Heilshorn, S. C.
  2014; 10 (4): 1487
- **Dual-stage growth factor release within 3D protein-engineered hydrogel niches promotes adipogenesis** *BIOMATERIALS SCIENCE*
  Greenwood-Goodwin, M., Teasley, E. S., Heilshorn, S. C.
  2014; 2 (11): 1627-1639
- **One-pot synthesis of elastin-like polypeptide hydrogels with grafted VEGF-mimetic peptides** *BIOMATERIALS SCIENCE*
  Cai, L., Dinh, C. B., Heilshorn, S. C.
  2014; 2 (5): 757-765
- **Engineered clathrin nanoreactors provide tunable control over gold nanoparticle synthesis and clustering.** *Journal of materials chemistry. B*
  Schoen, A. P., Huggins, K. N., Heilshorn, S. C.
  2013; 1 (48): 6662-6669
- **Cellular fate in 3D elastin-like scaffolds is regulated by stiffness and integrin ligand density**
  Heilshorn, S. C.

AMER CHEMICAL SOC.2013

- **Design of three-dimensional engineered protein hydrogels for tailored control of neurite growth** *ACTA BIOMATERIALIA*
  Lampe, K. J., Antaris, A. L., Heilshorn, S. C.
  2013; 9 (3): 5590-5599
- **Protein-Engineered Injectable Hydrogel to Improve Retention of Transplanted Adipose-Derived Stem Cells** *ADVANCED HEALTHCARE MATERIALS*
  Parisi-Amon, A., Mulyasasmita, W., Chung, C., Heilshorn, S. C.
  2013; 2 (3): 428-432
- **Microfluidic Investigation of BDNF-Enhanced Neural Stem Cell Chemotaxis in CXCL12 Gradients** *SMALL*
  Xu, H., Heilshorn, S. C.
  2013; 9 (4): 585-595
- **Sequence-Specific Crosslinking of Electrospun, Elastin-Like Protein Preserves Bioactivity and Native-Like Mechanics** *ADVANCED HEALTHCARE MATERIALS*
  Benitez, P. L., Sweet, J. A., Fink, H., Chennazhi, K. P., Nair, S. V., Enejder, A., Heilshorn, S. C.
  2013; 2 (1): 114-118
- **Protein-Engineered Hydrogels** *BIOMATERIALS SURFACE SCIENCE*
  Raphel, J., Parisi-Amon, A., Heilshorn, S. C.
  edited by Taubert, A., Mano, J. F., RodriguezCabello, J. C.
  2013: 207-237
- **Chemotaxis of human induced pluripotent stem cell-derived endothelial cells** *AMERICAN JOURNAL OF TRANSLATIONAL RESEARCH*
  Huang, N. F., Dewi, R. E., Okogbaa, J., Lee, J. C., Jalilrufaihah, A., Heilshorn, S. C., Cooke, J. P.
  2013; 5 (5): 510-U96
- **Spontaneous cardiomyocyte differentiation of mouse embryoid bodies regulated by hydrogel crosslink density** *BIOMATERIALS SCIENCE*
  Chung, C., Pruitt, B. L., Heilshorn, S. C.
  2013; 1 (10): 1082-1090
- **Engineered clathrin nanoreactors provide tunable control over gold nanoparticle synthesis and clustering** *JOURNAL OF MATERIALS CHEMISTRY B*
  Schoen, A. P., Huggins, K. N., Heilshorn, S. C.
  2013; 1 (48): 6662-6669
- **Microfluidic devices for quantifying the role of soluble gradients in early angiogenesis** *Mechanical and Chemical Signaling in Angiogenesis*
  Benitez, P., Heilshorn, S. C.
  edited by Reinhart-King, C. A.
  Heidelberg, Germany, Springer..2013: 1
- **Spontaneous cardiomyocyte differentiation of mouse and embryoid bodies regulated by hydrogel crosslink density.** *Biomaterials Science*
  Chung, C., Pruitt, B. L., Heilshorn, S. C.
  2013; 10 (1): 1082-1090
- **Dynamic remodelling of disordered protein aggregates is an alternative pathway to achieve robust self-assembly of nanostructures** *SOFT MATTER*
  Schoen, A. P., Cordella, N., Mehraeen, S., Arunagirinathan, M. A., Spakowitz, A. J., Heilshorn, S. C.
  2013; 9 (38): 9137-9145
- **Chemotaxis of human induced pluripotent stem cell-derived endothelial cells.** *American journal of translational research*
  Huang, N. F., Dewi, R. E., Okogbaa, J., Lee, J. C., Jalilrufaihah, A., Heilshorn, S. C., Cooke, J. P.
  2013; 5 (5): 510-520
- **Tuning colloidal association with specific peptide interactions** *SOFT MATTER*
  Schoen, A. P., Hommersom, B., Heilshorn, S. C., Leunissen, M. E.
  2013; 9 (29): 6781-6785

- **Complex chemoattractive and chemorepellent Kit signals revealed by direct imaging of murine mast cells in microfluidic gradient chambers** *INTEGRATIVE BIOLOGY*
  Shamloo, A., Manchandia, M., Ferreira, M., Mani, M., Nguyen, C., Jahn, T., Weinberg, K., Heilshorn, S.
  2013; 5 (8): 1076-1085
- **Engineered Protein Templates Synthesize Inorganic Nanomaterials** *CHEMICAL ENGINEERING PROGRESS*
  Schoen, A. P., Schoen, D. T., Huggins, K. N., Adhimoolam, A. M., Heilshorn, S. C.
  2012; 108 (12): 47-50
- **Tetrakis(hydroxymethyl) Phosphonium Chloride as a Covalent Cross-Linking Agent for Cell Encapsulation within Protein-Based Hydrogels** *BIOMACROMOLECULES*
  Chung, C., Lampe, K. J., Heilshorn, S. C.
  2012; 13 (12): 3912-3916
- **Protein-Engineered Biomaterials to Generate Human Skeletal Muscle Mimics** *ADVANCED HEALTHCARE MATERIALS*
  Sengupta, D., Gilbert, P. M., Johnson, K. J., Blau, H. M., Heilshorn, S. C.
  2012; 1 (6): 785-789
- **Photoreactive elastin-like proteins for use as versatile bioactive materials and surface coatings.** *Journal of materials chemistry*
  Raphel, J., Parisi-Amon, A., Heilshorn, S.
  2012; 22 (37): 19429-19437
- **Elastin-like matrices regulate embryonic stem cell-derived cardiomyocyte differentiation**
  Chung, C., Pruitt, B. L., Heilshorn, S. C.
  AMER CHEMICAL SOC.2012
- **Multifunctional Materials through Modular Protein Engineering** *ADVANCED MATERIALS*
  Dimarco, R. L., Heilshorn, S. C.
  2012; 24 (29): 3923-3940
- **Building stem cell niches from the molecule up through engineered peptide materials** *NEUROSCIENCE LETTERS*
  Lampe, K. J., Heilshorn, S. C.
  2012; 519 (2): 138-146
- **Improving Viability of Stem Cells During Syringe Needle Flow Through the Design of Hydrogel Cell Carriers** *TISSUE ENGINEERING PART A*
  Aguado, B. A., Mulyasasmita, W., Su, J., Lampe, K. J., Heilshorn, S. C.
  2012; 18 (7-8): 806-815
- **Utilizing protein-engineered biomaterials to create human muscle tissue constructs**
  Sengupta, D., Gilbert, P. M., Johnson, K. J., Blau, H. M., Heilshorn, S. C.
  AMER CHEMICAL SOC.2012
- **Self-assembly of Clathrin protein nanostructures**
  Arunagirinathan, M., Gibbons, B. J., Schoen, A. P., Huggins, K. N. L., Heilshorn, S. C.
  AMER CHEMICAL SOC.2012
- **Molecular recognition enables biotemplating at distinct protein sites**
  Huggins, K. N., Schoen, A. P., Arunagirinathan, M. A., Heilshorn, S. C.
  AMER CHEMICAL SOC.2012
- **Mechanisms of Vascular Endothelial Growth Factor-Induced Pathfinding by Endothelial Sprouts in Biomaterials** *TISSUE ENGINEERING PART A*
  Shamloo, A., Xu, H., Heilshorn, S.
  2012; 18 (3-4): 320-330
- **The intestinal stem cell markers Bmi1 and Lgr5 identify two functionally distinct populations** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Yan, K. S., Chia, L. A., Li, X., Ootani, A., Su, J., Lee, J. Y., Su, N., Luo, Y., Heilshorn, S. C., Amieva, M. R., Sangiorgi, E., Capecchi, M. R., Kuo, et al
  2012; 109 (2): 466-471

- **Hydrogel crosslinking density regulates temporal contractility of human embryonic stem cell-derived cardiomyocytes in 3D cultures** *SOFT MATTER*
  Chung, C., Anderson, E., Pera, R. R., Pruitt, B. L., Heilshorn, S. C.
  2012; 8 (39): 10141-10148
- **Hydrogels from Protein Engineering** *Biomimetic Approaches for Biomaterials Development*
  Greenwood-Goodwin, M., Heilshorn, S. C.
  edited by Mano, J. F.
  Mannheim, Germany, Wiley-VCH Verlag..2012: 1
- **Engineered Protein Biomaterials.** *Biomedical Engineering Handbook*
  Parisi-Amon, A., Heilshorn, S. C.
  edited by Bronzino, J. D., Peterson, D. R., FIsher, J. P.
  Boca Raton, FL, CRC Press.2012; 4th: 1
- **Protein-Engineered Hydrogels.** *Biomaterials Surface Science*
  Raphel, J., Parisi-Amon, A. P., Heilshorn, S. C.
  edited by Taubert, A., Mano, J., Rodriquez-Cabello, J. C.
  Mannheim, Germany, Wiley-VCH Verlag..2012: 1
- **Photoreactive elastin-like proteins for use as versatile bioactive materials and surface coatings** *JOURNAL OF MATERIALS CHEMISTRY*
  Raphel, J., Parisi-Amon, A., Heilshorn, S. C.
  2012; 22 (37): 19429-19437
- **Template Engineering Through Epitope Recognition: A Modular, Biomimetic Strategy for Inorganic Nanomaterial Synthesis** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Schoen, A. P., Schoen, D. T., Huggins, K. N., Arunagirinathan, M. A., Heilshorn, S. C.
  2011; 133 (45): 18202-18207
- **Molecular-Level Engineering of Protein Physical Hydrogels for Predictive Sol-Gel Phase Behavior** *BIOMACROMOLECULES*
  Mulyasasmita, W., Lee, J. S., Heilshorn, S. C.
  2011; 12 (10): 3406-3411
- **Protein-engineered biomaterials: Nanoscale mimics of the extracellular matrix** *BIOCHIMICA ET BIOPHYSICA ACTA-GENERAL SUBJECTS*
  Romano, N. H., Sengupta, D., Chung, C., Heilshorn, S. C.
  2011; 1810 (3): 339-349
- **Vacuum soft lithography to direct neuronal polarization** *SOFT MATTER*
  Nevill, J. T., Mo, A., Cord, B. J., Palmer, T. D., Poo, M., Lee, L. P., Heilshorn, S. C.
  2011; 7 (2): 343-347
- **Protein-Engineered Biomaterials: Synthesis and Characterization.** *Comprehensive Biomaterials.*
  Mulyasasmita, W., Heilshorn, S. C.
  edited by Ducheyne, P., Healy, K., Hutmacher, D. W.
  Oxford, UK, Elsevier Science..2011: 1
- **Essential Regulation of CNS Angiogenesis by the Orphan G Protein-Coupled Receptor GPR124** *SCIENCE*
  Kuhnert, F., Mancuso, M. R., Shamloo, A., Wang, H., Choksi, V., Florek, M., Su, H., Fruttiger, M., Young, W. L., Heilshorn, S. C., Kuo, C. J.
  2010; 330 (6006): 985-989
- **High Speed Water Sterilization Using One-Dimensional Nanostructures** *NANO LETTERS*
  Schoen, D. T., Schoen, A. P., Hu, L., Kim, H. S., Heilshorn, S. C., Cui, Y.
  2010; 10 (9): 3628-3632
- **Protein-Engineered Biomaterials: Highly Tunable Tissue Engineering Scaffolds** *TISSUE ENGINEERING PART B-REVIEWS*
  Sengupta, D., Heilshorn, S. C.
  2010; 16 (3): 285-293
- **Local and Long-Range Reciprocal Regulation of cAMP and cGMP in Axon/Dendrite Formation** *SCIENCE*
  Shelly, M., Lim, B. K., Cancedda, L., Heilshorn, S. C., Gao, H., Poo, M.

2010; 327 (5965): 547-552

- **Matrix density mediates polarization and lumen formation of endothelial sprouts in VEGF gradients** *LAB ON A CHIP*
  Shamloo, A., Heilshorn, S. C.
  2010; 10 (22): 3061-3068
- **Novel Receptor-Mediated Endothelial Cell Chemotaxis**
  Shamloo, A., Kuhnert, F., Choksi, V., Kuo, C., Heilshorn, S.
  CELL PRESS.2010: 497A
- **Matrix Rigidity Mediates Growth Factor Response during 3D Endothelial Cell Sprouting**
  Shamloo, A., Heilshorn, S. C.
  CELL PRESS.2010: 730A
- **Protein Engineered Biomaterials.** *Protein Engineering.*
  Wong, C. P., Heilshorn, S. C.
  edited by Park, S. J., Cochran, J. R.
  Boca Raton, FL, CRC Press.2010: 1
- **The Interplay between Biomechanical and Biochemical Factors Regulates Lumen Formation and Navigation of Endothelial Cell Sprouts** *12th ASME Summer Bioengineering Conference*
  Shamloo, A., Heilshorn, S. C.
  AMER SOC MECHANICAL ENGINEERS.2010: 429–430
- **Biomaterial Design Strategies for the Treatment of Spinal Cord Injuries** *JOURNAL OF NEUROTRAUMA*
  Straley, K. S., Foo, C. W., Heilshorn, S. C.
  2010; 27 (1): 1-19
- **Two-component protein-engineered physical hydrogels for cell encapsulation** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Foo, C. T., Lee, J. S., Mulyasasmita, W., Parisi-Amon, A., Heilshorn, S. C.
  2009; 106 (52): 22067-22072
- **Dynamic, 3D-Pattern Formation Within Enzyme-Responsive Hydrogels** *ADVANCED MATERIALS*
  Straley, K. S., Heilshorn, S. C.
  2009; 21 (41): 4148-?
- **Gradient lithography of engineered proteins to fabricate 2D and 3D cell culture micro environments** *BIOMEDICAL MICRODEVICES*
  Wang, S., Foo, C. W., Warrier, A., Poo, M., Heilshorn, S. C., Zhang, X.
  2009; 11 (5): 1127-1134
- **Formation and properties of magnetic chains for 100nm nanoparticles used in separations of molecules and cells** *7th International Conference on Scientific and Clinical Applications of Magnetic Carriers*
  Wilson, R. J., Hu, W., Fu, C. W., Koh, A. L., Gaster, R. S., Earhart, C. M., Fu, A., Heilshorn, S. C., Sinclair, R., Wang, S. X.
  ELSEVIER SCIENCE BV.2009: 1452–58
- **Formation and properties of magnetic chains for 100 nm nanoparticles used in separations of molecules and cells.** *Journal of magnetism and magnetic materials*
  Wilson, R. J., Hu, W., Fu, C. W., Koh, A. L., Gaster, R. S., Earhart, C. M., Fu, A., Heilshorn, S. C., Sinclair, R., Wang, S. X.
  2009; 321 (10): 1452-1458
- **Designer Protein-Based Scaffolds for Neural Tissue Engineering** *Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*
  Straley, K., Heilshorn, S. C.
  IEEE.2009: 2101–2102
- **Independent tuning of multiple biomaterial properties using protein engineering** *SOFT MATTER*
  Straley, K. S., Heilshorn, S. C.
  2009; 5 (1): 114-124
- **Independent tuning of multiple biomaterial properties using protein engineering** *Soft Matter*

Straley KS, Heilshorn SC
2009; 5: 114-124

- **Dynamic, three-dimensional pattern formation within enzyme-responsive hydrogels** *Advanced Materials*
  Straley KS, Heilshorn SC
  2009; 21 (41): 4148-4152
- **Design and adsorption of modular engineered proteins to prepare customized, neuron-compatible coatings.** *Frontiers in neuroengineering*
  Straley, K. S., Heilshorn, S. C.
  2009; 2: 9-?
- **Endothelial cell polarization and chemotaxis in a microfluidic device** *LAB ON A CHIP*
  Shamloo, A., Ma, N., Poo, M., Sohn, L. L., Heilshorn, S. C.
  2008; 8 (8): 1292-1299
- **LKB1/STRAD promotes axon initiation during neuronal polarization** *CELL*
  Shelly, M., Cancedda, L., Heilshorn, S., Sumbre, G., Poo, M.
  2007; 129 (3): 565-577
- **Lithographic patterning of photoreactive cell-adhesive proteins** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
  Carrico, I. S., Maskarinec, S. A., Heilshorn, S. C., Mock, M. L., Liu, J. C., Nowatzki, P. J., Franck, C., Ravichandran, G., Tirrell, D. A.
  2007; 129 (16): 4874-?
- **Cell-binding domain context affects cell behavior on engineered proteins** *BIOMACROMOLECULES*
  Heilshorn, S. C., Liu, J. C., Tirrell, D. A.
  2005; 6 (1): 318-323
- **Comparative cell response to artificial extracellular matrix proteins containing the RGD and CS5 cell-binding domains** *BIOMACROMOLECULES*
  Liu, J. C., Heilshorn, S. C., Tirrell, D. A.
  2004; 5 (2): 497-504
- **Endothelial cell adhesion to the fibronectin CS5 domain in artificial extracellular matrix proteins** *BIOMATERIALS*
  Heilshorn, S. C., DiZio, K. A., Welsh, E. R., Tirrell, D. A.
  2003; 24 (23): 4245-4252
- **Liquid personal cleansing compositions which contain a complex coacervate for improved sensory perception** *Assignee: The Procter & Gamble Company.*
  Glenn, R. W., Sine, M. R., Evans, M. D., Carethers, M. E., Heilshorn, S. C.
  2000