CURRICULUM VITAE

NAME: Xiuzhi Susan Sun, Ph.D.
University Distinguished Professor,
Bio-Materials & Technology Lab (BTL)
Department of Grain Science and Industry
Department of Biological and Agricultural Engineering
Kansas State University, Manhattan, KS 66506

1. EDUCATION

Ph.D. Agricultural & Biological Engineering, University of Illinois, Urbana, IL, USA, May 1993
M.S. Agricultural Engineering, Northeast Agricultural University, China, Dec. 1986
B.S. Agricultural Engineering, Northeast Agricultural University, China, Dec. 1982

2. RESEARCH INTERESTS

Biopolymers, bioproducts and biorefining process engineering; Rheology and phase transition of biopolymers; Biobased adhesives, Biodegradable plastics; Structure and functional properties of biomacromolecules; Biomaterials and hydrogels for environmental and medical uses.

3. TEACHING

New Courses Developed

GRSC 825, Novel Uses of Renewable Biomaterials (1998-2001);
GRSC 830, Physical Properties of Cereal Polymers (2002 –present);
GRSC 740, Biomaterial Processing (2006 – present);
GRSC 790, Grain Processing and Utilization in China, Study Abroad Program, 2009-

4. ACADEMIC APPOINTMENTS

2011- pres University Distinguished Professor, Department of Grain Science and Industry, Department of Biological and Agricultural Engineering, Kansas State University
2007 - pres Co-Director, Center for Biobased Polymers By Design
2012 – pres Founder, President, Chairperson, CTO, PepGel, LLC
2004 - 2011 Professor, Grain Science and Industry, Kansas State University
2001 - 2004 Associate Professor, Grain Science and Industry, Kansas State University
1996 - 2001 Assist. Professor, Grain Science and Industry, Kansas State University
1995 to 1995 Lecturer/Research Associate, Agricultural Engineering, Texas A&M University
1989 to 1993 Research and Teaching Assistant, Agricultural & Biological Engineering, University of Illinois,
1982 to 1989 Lecturer, Agricultural Engineering, Northeast Agricultural University, Harbin, China.

5. HONOR, AWARDS, PROFESSIONAL SERVICES

Awards

- 2015 Innovation Festival Display at the Smithsonian National Museum of American History
- Member of National Academy of Inventors, 2015
- Colloquia Distinguished Lecture, University of Southern California, Nov 6-7, 2013
- 50 Kansans You Should Know recognition, Ingram's KS, 2013
- Lifetime Achievement Award, BioEnvironmental Polymers Society, 2012
- Inaugural Women of Distinction, Kansas State University, 2012
- Higuchi Research Achievement Award – Applied Science, State of Kansas, 2011
- Scientist, Science in Kansas150th Anniversary, 2011
- Professional Performance Award, Kansas State University, 2010
- Certificate of Outstanding International Educator, KSU 2009
- Outstanding Food Scientist Award, Institute of Food Technology Society, 2008.
- Outstanding Senior Scientist Award, The Scientific Research Society, Sigma XI, 2007.
- Longjiang Scholar Award, Heilongjiang Province, China, 2006.
- ADVANCE CAP Award, NSF, KSU, 2006.
- Sloan-Mentor Awards, KSU, 1997, 1998.
- Presidential Faculty Development Award, KSU, 1997.
- Outstanding Service Award, American Association of Cereal Chemists, 2001.

Professional Services at National Level

- Associate Editor, J. of Biobased Materials and Bioenergy, 2006 – present.
- Associate Editor, Transaction of ASABE, 2011 - present
- Associate Editor, Cereal Chemistry, 2004-2007.
- Associate Editor: J. Polymers and The Environment; 2001-2007.
- Secretary, The BioEnvironmental Polymer Society, 2010-2013 (2012)
- Chair of Excellent Paper Award Committee, American Society of Biological and Agriculture Engineers, 2000-2005.
- Jury of C.W Bradender Award, American Association of Cereal Chemists, 2001.
- Jury of Undergraduate Student Scholarship, American Association of Cereal Chemists, 2002-2005.
- Chair of Rheology Division, American Association of Cereal Chemists, 2001.

Chair Technical Symposium

- Chair, Bio-inspired materials for human health, World Congress of Advanced Materials, Chongqing, China, June 5-8, 2014
- Co-Chair, Polymers and The Environment – Emerging Green Technologies and Science, the 18th BEPS international conference, Toronto, Canada, Oct 13-16, 2010.
- Chair, International Conference on Wood Adhesives: Biobased Adhesives, Forest Products Society, Lake Tahoe, Nevada, USA, Sep 28-30, 2009,
- Chair, Symposium - Rheology and Phase Transitions in Relations to Cereal Polymer Processing and Product Quality, American Association of Cereal Chemists, 2001.

- Chair, Symposium, New Uses of Soybeans, AOCS/China, Beijing, China, 2002.

Technical Panels

- Chair, USDA National Research Initiative, Biobased Products and Bioenergy, 2004.
- Chair, USDA National Research Initiative, Biobased Products and ioenergy,2005.
- USDA-DOE, Panel Review, Biomass Research Initiative, Washington, DC. 2009
- DOE/USDA Biomass Review Panel, 2007.
- USDA/NRI Review Panel – Value Added Program-Industrial Uses, 2003.
- USDA/SBRI - Industrial Applications of Agriculture Materials, 2002.
- USDA-ARS/NCAUR, Plant Polymer Lab Research Leader search committee, Oct 2010.
- NSF, Hard Materials &Composites Panel, Feb 13-14, 2012

Strategic Planning Activities

- Chair, Workshop – Plant Derived Biobased Materials and Fuels, KSU, 2004.
- NSF Sponsored Workshop on Biomass Sustainability Assessment, Oklahoma City, OK.
- United Soybean Board Technical Advisory Panel-Adhesives.
- National Planning Workshop - Bio Nano Technology of the Future, 2004.
- DOE Workshop - Identification of Industrial Crops for Biofuel and Bioproducts, 2003.
- USDA BBCC Strategic Planning Workshop on Biobased Products and Bioenergy, 2005.
- Kansas Bioscience Authority Hot Team Workshop on Bioenergy and Environment, 2004-2006.
- Kansas Bioscience Authority Biomaterials Initiative, 2007-2008.
- State wide NSF EPSCoR Initiative on Climate Change and Energy: Basic Science, Impacts, and Mitigation, 2008-present
- Kansas Bioenergy and Biorefining Center of Innovation, 2008-2009

Agency-Wide across Organization Services

- Associate Director of the Joint Research Center in Agriculture Products Processing under USDA-MOST cooperation protocol (USDA and China), 2008-present.
- Kansas Leader, Multi-States USDA S1007/S1041 Projects "The Science and Engineering for a Biobased Industry and Economy, 2001 - present.

Members of Scientific Professional Societies

- American Society of Agricultural Engineers (ASAE, since 1990).
- Institute of Food Technology (IFT, since 1992).
- American Association of Cereal Chemists (AACC, since 1996).
- American Chemical Society (ACS, since 1998).
- BioEnvironmentally Polymer Society (BEPS, since 1996)
- American Academic Association of Scientists (AAAS, since 2005)
- National Association of College and Teachers of Agricultural (NACTA, 1996 - 1998).

Significant Services at University Level:

- University Distinguished Professor Council, KSU, 2011-present
- Integrity in Research and Scholarly Activity Committee, KSU, 2006-2009.
- Appendix "O" Committee, KSU, 2008
- Chair, Faculty Annual Evaluation and Tenure-Promotion Committee, 2009
- Chair, Outstanding Scientists Award Committee, Sigma XI, KSU Chapter, 2008, 2009.
- COA Dean Search Committee, 2011-2012
- COA Research Committee-2025 Strategic Planning, 2011-2012
- Co-Chair, Core Facility Committee, 2011-2012

6. FUNDING RECORDS

Total $19.5 million extramural and internal funding sponsored by USDA, NSF, DOE, DOD, The State of Kansas, Kansas State University, and Industries from Jan 1996 to date. Among the $18.5 million, $12.5 million is lead-PI, and $6.9 million is co-PI.

Funded Projects as Lead PI

Duration	Agent	Amount	Project Title	Collaborators
07/96-06/00	KS AES	$87,000	Biodegradable feed packaging materials	P. A. Seib
07/97-12/99	KS Soybean Comm.	$115,600	Molecular structure, dynamic behavior, and functional properties of soy proteins	O. Prakash
09/97-12/98	NSF	$45,000	New plastics and new composite	
07/98-06/99	DOD	$21,170	Biodegradable composite for military applications	
06/97-05/01	KTEC	$73,178	Processibility of starch and polylactic acid	
07/97-06/99	KTEC	$52,305	Enhancement of water and mold resistant of wheat strawboard	
04/98-03/00	P&G and Keebler	$40,000	Texture characterization of snack foods	
07/98-06/01	KS Wheat Comm.	$64,750	Compatibility of wheat starch and polylactic acid	P. A. Seib J. Brent
07/98-	KS Sorghum	$71,430	Novel sorghum	C.

06/00	Comm.		composite flour designed for bread making	Klopfenstein D. Eustace C. E. Walker
07/99-06/00	KS Soybean Comm.	$67,232	Adhesive performance of soy proteins in navy applications	W. Schapaugh
08/99-07/01	DOD	$53,316	Adhesive performance of modified proteins in fiber cardboards	
05/99-06/00	USDA	$30,300	Biodegradable and edible feed packaging materials	
05/99-12/00	DOD	$12,000	Marine degradable composite for gun plug	
07/00-06/05	KS AES	$56,000	Biobased plastics	P. A. Seib
07/00-06/05	KS AES/APUF	$75,000	Biobased adhesives	
09/98-12/01	USDA	$120,000	Objective characterization of texture properties of crunchy foods during chewing	C. Klopfenstein C. Setser N. Zhang
1999-2002	USDA	$62,000	Biodegradable and edible feed packaging materials	
1998-2002	USDA	$85,000	Mechanism and texture of gluten/starch ageing	F. Dowell
1999-2003	KS Wheat Commission	$91,910	Compatibility of starch and polylactic acids	P. A. Seib
1999-2003	DOD	$113,000	Biodegradable composites for marine applications	D. Wang
2001	USDA	$22,200	Edible/Biodegradable Composites for Animal Feed Supplement Containers	
7/01-12/01	DOD	$30,000	Adhesion Performance of Modified Soy Protein Adhesive	D. Wang
07/02-06/08	S1007	$36,000	Multi-States, biobased materials and biofuels	D. Wang

11/01-06/04	DOE	$1,890,000	Affordable Resins and Adhesives from Optimized Soybean Varieties	S. H. Hulbert W. T. Schapaugh H. N.Trick D. Wang X. Wang
2002	Hill's Pet Nutrition, Inc.	$26,000	Identification of Factors Affecting Petfood Durability	
07/01-06/03	DOD	$81,216	Environmentally Favorable Adhesives	
07/03-06/06	CPBR/EPA/DOE	$135,000	High strength biobased plastics from starch and poly(lactic acid)	P. A. Seib
2004	DOD	$56,309	Low-Density High Strength Biodegradable Composite	
2004 – 2006	Georgia Pacific	$146,213	Soy Adhesives Research	
07/04-06/07	Targeted Excellent Program KSU	$900,000	Biomaterials by Design	D. H. Hua S. H. Hulbert T. S. Rahman J. M. Tomich D. Wang
10/05-09/08	USDA	$90,240	Poly(Lactic Acid)/Starch Blend for a Degradable Agricultural Mulch Film	
2006-2008	DOD	$79,254	Scale-Up Processing of Soy Adhesives for Low Density Fiber Cardboard	
10/06-03/08	DOD	$85,000	ON-Demand subzero ration components for use in extreme cold environment	D. Wang P. Chinochoti
02/06-01/09	DOD	$175,000	Biodegradable Polymer Coated Paper and Fiberboard for the Military Applications	D. Wang Z. Zhong
2007	Hill's Pet Nutrition, Inc.	$27,708	Development of Cold Pellet Processing Technology	

11/07-10/10	USDA	$96,000	Compatibility of soy protein polymer with poly(lactic acid)	
2005-2008	Foseco International Limited	$192,131	Soy-Based Binders	D. Wang
2007-2008	CPBR/DOE	$80,000	Bionanocomposites from poly(lactic acids) and biopolymers	
2007-2009	Soybean Commission/United Soybean Board co-funding	$97,00	Soy Latex Like Adhesives for Glass and Ceramic Consumer Products Labeling	D. Wang
2008-2012	USDA	$333,962	Affordable and Durable Biobased Adhesives for Wood Veneer Applications	D. Wang
2009-2014	Soybean Commission/United Soybean Board co-funding	$219,000	Pressure sensitive adhesives from soy oil	D. Wang
2008	PolyOne Corporation	$15,000	Bio-Composites Dervied from Renewable Materials	
2008-2009	Industrial funds (Wrigley)	$98,000	Viscoelastic biopolymers for chewing gums	
2009-2014	NSF/EPSCoR	$160,000 ($32k for 2011)	Biorenewable fuels and chemicals: co-products from algae biomass	W. Yuan, B. Sturm, V. Smith, M.Smith D. Wang
2011-2012	USB	$94,000	Pilot scale studies of soy protein based adhesives	
2011-2012	Johnson Cancer Center	$25,000	Novel protein peptide structure and its hydrogel properties for 3-D cell culture with potential for cancer drug development and treatment	
2011-2015	Higuchi – KU Endowment	$10,000	Research Achievement	
2012-2014	Henkel	$190,000	Plant oils wax	

2013-2016	USDA	$5,078,000	Enhancing economic viability of camelina as biofeedstock: Production and bioproducts development	D. Wang, Shing I
2013	NSF/STTR (PepGel)	$110,000	Novel Peptide hydrogel for 3D cell cultures	Co-PIs, Nguyen, Weiss
Total		**$12,523,421**		

Funded Projects As Co-PI

09/96-08/97	USDA	$19,476	Quality oriented marketing of hard winter wheat	K. Stiegert T. Herrman
09/96-08/00	USDA	$182,934	Quality oriented marketing of hard winter wheat	K. Stiegert T. Herrman
05/97-04/98	KTEC	$18,800	Exploration of biopolymers in impact resistant composite	Y. Wang
07/97-06/98	KS Sorghum Comm.	$33,600	Characterizing flavors of sorghum cultivars potentially useful for foods	C. Setser R. Kraig C. E. Walker
2001-2004	KS Wheat Commission	$65,000	Wheat for Chinese Northern-Style Steamed Bread	C. E. Walker
2003-2004	NSF	$940,509	Establishment of the Lipidomics Research Center at K-State	X. Wang D. A. Rintoul J. Shah R. Welti
2004	USDA	$249,000	Phase-Transition Analysis and Non-Invasive Imaging for Microstructure in Biopolymeric Foams	S. Alavi
2009-2011	United Sorghum Checkoff program	$90,317	Protein adhesives from low cost sorghum DDGS	D. Wang
2009	USDA/SBIR	$80,000	Feasibility of sorghum DDGS for adhesives	D. Wang
2009-2014	NSF/EPSCoR	$4,000,000	Solar Fuels and Electricity Theme leader: Biorefining for fuels and co-products	J. Wu (KU) J. Li (KSU) F. D'Souza (WSU)

Total		**$5,983,429**		

7. SUPERVISION (66 total: 54 past and 12 current)

Graduated Students (28 total, 14 PhD)

Greg Karr 1996-1998	M.S.
Muilin Cheong 1996-1998	M.S.
Pamela Hunt 1998-2000	M.S.
Hongde Pan 1996-2000	M.S.
Jie Hu 1998-2000	M.S.
Hua Wang 1998-2001	M.S.
Stephanie Blanche 2000-2003	M.S.
Shuping Yan 2002-2005	M.S.
Lu Zhang 2005-2008	M.S.
Xin Li 2006-2009	M.S.
Namhoon Kim 2012-2014	M.S.
Jonggeun Suang 2012-2014	M.S.
Tiffany Carter 2012-2014	M.S.
Tianjing Tong 2009-2012	M.S.
Xioaqun Mo 1996-2000	Ph.D.
Fengcheng Wang 1997-2001	Ph.D.
Lin Carson 1998-2002	Ph.D.
Micheal Cheng 1999-2004	Ph.D.
Feng Xie 1998-2003	Ph.D.
Feng Liang 1995-1998	Ph.D.
Ricardo Moura 2000-2006	Ph.D.
Li Zhu 2002-2006	Ph.D.
Ying Wang 2002-2005	Ph.D.
B. Kollbe Ann, 2009-2011	Ph.D.
Guangyan Qi 2007-2011	Ph.D.
Yonghui Li 2007-2011	Ph.D
Hongzhou Huang 2007-2012	Ph.D.
Minjung Kim 2009-2015	Ph.D.

Exchange Graduate Students with International Universities (3 total)

B. J. Ahn, 06, 2005 – 12, 2007	Ph.D. Konkuk University, Seoul Korea
Yonghui Li, 01, 2006 – 09, 2006	M.S. Zhejiang University, Hangzhou, China
Kun Fang, 09, 2007- 04, 2008	M.S. Zhejiang University, Hangzhou, China

Postdocs, Research Associates, and Visiting Scholars (21 total, 16 Postdoc)

Past
Dr. Hak-Ryang Kim, Research Associate, 1997
Dr. Liqun Wang, Visiting Prof.1997-1998
Mr. Ke Bian, Visiting Scholar, 1997-1998
Mr. Greg Karr, Research Technician, 1998-1999
Dr. Weining Huang, Research Associate, 1998-1999
Dr. Tianyi Ke, Postdoctoral Research Associate, 1998-2002
Dr. Zhikai Zhong, Postdoctoral Research Associate, Jan. 1999-2006,
Dr. Namyoun Hur, Visiting Scholar, Jan. 1999 - Jan. 2000
Dr. H. Park, Visiting Scholar, Jan. 2000 - Jan. 2001
Dr. Yankun Peng, Postdoc, March, 2000 – 2003
Dr. Maria Silvina Zutara, Postdoc 2003-2005
Dr. Fengcheng Wang, Postdoc, Oct. 2001 – 2003
Dr. Jianfeng Zhang, Postdoc, Jan 2, 2002 – 2005
Dr. Jihong Li, Postdoc Fellow, March 2005 – 2008
Dr. Amy Mo, Research Scientist, 2002-2008
Dr. Ying Wang, Postdoc, 2005-2006.
Dr. Biaobing Wang, postdoc, 2006-2009
Dr. Guoping Yu, Visiting Scientist, Jan. 2008-Sept. 2008
Dr. Xinchun Shen, Post Doctoral Researcher, 2002-2005
Dr. Jeanne Shera, Postdoc, 2007-2011
Dr. Karthik Venkateshan, Postdoc, 2007–2010
Dr. Zhigang Xiao, Visiting Scholar, 2009-2010
Dr. Hongzhou Huang, Postdoc, 2012 – 2014
Dr. Yonghui Li, Research Scientist, 2011-2015
Dr. Guangyan Qi Postdoc, 2012-present
Dr. Jun Liang, Postdoc, 2013 – 2015
Dr. Cong Li, Postdoc, 2013-present
Ms. Meirong Wang, Technician, 2013-2015

Current Graduate Students (6 total)

Haijing Liu, 2013 F-present	Ph.D.
Xiangwei Zhu, 2013 F-present	Ph.D.
Jonggeun Sung 2014 F-present	Ph.D.
Quan Li 2014 F-present	M.S.
Duanbin Xu 2015 F-present	M.S.

Current Postdoc/research associates (6 total)
Dr. Yonghui Li, Postdoc, 2011-present
Dr. Guangyan Qi, Postdoc, 2011 – present
Dr. Cong Li, 2013 – present

8. COMPLETE PUBLICATION LIST
Peer-reviewed

1. Min Jung Kim, Xiuzhi Susan Sun. 2015, Correlation between physical properties and shear adhesion strength of enzymatically modified soy protein-based adhesives. JAOCS, 19: 1-12.
2. Y. Li, Donghai Wang, Xiuzhi Susan Sun. 2015. Copolymers from epoxidized soybean oil and lactic acid oligomers for pressure-sensitive adhesives. Royal Society of Chemistry, RCS Advances, 5. 27256-27265.
3. G.P. Pandey, S.A. Klankowski, Y. Li, X.S. Sun, J. Wu, R.A. Rojeski, and J. Li. 2015. Effective Infiltration of Gel Polymer Electrolyte into Silicon-Coated Vertically Aligned Carbon Nanofibers as Anodes for Solid-State Lithium-ion Batteries. *ACS Applied Materials & Interfaces*, 7, 20909-20918.
4. Y. Li, X.S. Sun. 2015. Camelina oil derivatives and adhesion properties. Industrial Crops and Products, 73, 73-80.
5. Y. Li, X.S. Sun. 2015. Synthesis and characterization of acrylic polyols and polymers from soybean oils for pressure-sensitive adhesives. RSC Advances, 5, 44009-44017.
6. H. Liu, C. Li, X.S. Sun. 2015. Improved Water Resistance in Undecylenic Acid (UA)-Modified Soy Protein Isolate (SPI)-Based Adhesives. Industrial Crops and Products, 74:577-584
7. Y. Li, X.S. Sun. 2015. Polyols from epoxidized soybean oil and alpha hydroxy acids and adhesion properties from UV polymerization. *International Journal of Adhesion and Adhesives*, 63, 1-8.
8. D. Kumar, C. Kandl, C. Hamilton, Y. Shnayder, T. T. Tsue, K. Kakarala, L. Ledgerwood, X. S. Sun, H. H. Huang, D. Girod, S. M. Thomas. 2015, Anti-HGF antibody ficlatuzumab mitigates tumor-associated fibroblast-facilitated head and neck cancer progression, J of American Medical Association (JAMA)-Otolaryngology, online, Doi:10.1001/jamaoto.2015.2381
9. Namhoon Kim, Yonghui Li, Xiuzhi Susan Sun. 2015. Epoxidation of Camelina sativa oil and peel adhesion properties. *Industrial Crops and Products*, 64, 1-8.
10. N. Li, G. Qi, X.S. Sun, and D. Wang. 2015. Adhesion property of camelina protein fractions isolated with different sequences. Industrial Crops and Products, 69, 263-272.
11. Hongzhou Huang, Debabani Ganguly, Jianhan Chen, and Xiuzhi S. Sun, 2015, Conformational Flexibility and pH Effects in Anisotropic Growth of Sheet-like Assembly by Amphiphilic Peptides, J of Nanoscience and Nanotechnology, 15: 4470-4479.
12. Jonggeun Sung, Yonghui Li, Xiuzhi Susan Sun. 2015. Plasticization effects of dihydroxyl soybean oil improve flexibilities of epoxy-based films for coating applications. *Journal of Applied Polymer Science*, *Vol 132(6)*: 41773.
13. Min Jung Kim, Xiuzhi Susan Sun. 2014. Adhesion properties of soy protein crosslinked with organic calcium silicate hydrate hybrids, *Journal of Applied Polymer Science*, 131(17). 40693, doi: 10.1002/app.40693 .
14. Ningbo Li, Guangyan Qi, Xiuzhi Susan Sun, Donghai Wang, Scott R Bean, Deidre Blackwell. 2014. Isolation and characterization of protein fractions isolated from camelina meal. *Transactions of the ASABE*, 57, 1, 169-178.

15. Yonghui Li, Caihong Chen, Jun Li, Xiuzhi Susan Sun. 2014. Photoactivity of poly(lactic acid) nanocomposites modulated by TiO2 nanofillers. *Journal of Applied Polymer Science, 131, 40241, doi: 10.1002/app.40241*.
16. Yonghui Li, Donghai Wang, Xiuzhi Susan Sun. 2014. Oxirane cleavage kinetics of epoxidized soybean oil by water and UV‐polymerized resin adhesion properties. *J Am Oil Chem Soc*, 92(1): 121-131.
17. Yonghui Li, Xiuzhi Susan Sun. 2014. Di-hydroxylated soybean oil polyols with varied hydroxyl values and their influence on UV-curable pressure-sensitive adhesives. *J Am Oil Chem Soc*, 91(8): 1425-1432.
18. L. Peña, K. L. Hohnb, J. Li, X.S. Sun and D. Wang. 2014. Effect of synthesis conditions on surface and catalytic properties of propyl-sulfonic acid-functionalized nanoparticles. J. Biomaterials and Nanobiotechnology 5(4): 241-253.
19. Y. H. Li, C. Chen, J. Li, X. S. Sun, 2013, Photoactivity of Poly(lactic acid) nanocomposites modulated by TiO_2 nanofillers, J of Applied Polymer Science, DOI: 10.1002/app.40241
20. Li, X., Galliher-Beckley, A.J., Nietfeld, J.C., Huang, H., Sun, X., Faaberg, K.S., and Shi, J. 2013, Peptide nanofiber hydrogel adjuvanted live virus vaccine induces cross-protective immunity to porcine reproductive and respiratory syndrome virus**,** Vaccine 31 (2013), pp. 4508-4515
21. Zhigang Xiao, Yonghui Li, Xiaorong Wu, Guangyan Qi, Ningbo Li, Ke Zhang, Donghai Wang, and Xiuzhi Susan Sun, 2013, Utilization of Sorghum Lignin to Improve Adhesion Strength of Soy Protein Adhesives on Wood Veneer, Industrial Crops and Products, 50:501-509
22. Guangyan Qi, Ningbo Li, Donghai Wang, Xiuzhi Susan Sun, 2013, Adhesion and physicochemical properties of soy protein modified by sodium bisulfite, J. American Oil Chemistry, 90(12): 1917-1926
23. Guangyan Qi, Ningbo Li, Donghai Wang, Xiuzhi Susan Sun, 2013, Physicochemical properties of soy protein adhesives modified by 2-octen-1-ylsuccinic anhydride, Industrial Crops and Products, 46. 165-172
24. Ahn, B. Kollbe, Jonggeun Sung, Nassim Rahmani, George Wang, Namhoon Kim, Kevin Lease, and Xiuzhi Susan Sun, 2013, UV-curable, high-shear pressure-sensitive adhesives derived from acrylated epoxidized soybean oil. J. Adhesion, 89: 1-16.
25. Huang H, Ding Y, Sun XS, Nguyen TA, 2013, Peptide Hydrogelation and Cell Encapsulation for 3D Culture of MCF-7 Breast Cancer Cells. PLoS ONE 8(3): e59482. doi:10.1371/journal.pone.0059482
26. Xin Li, Donghai Wang, Jo A. Ratto, Xiuzhi Susan Sun, 2013, Production of High Strength, Thin-layered, Pulp Fiberboard Using Soy Protein Adhesives, J of Adhesion Science and Technology, 27(18-19):2065-2074.
27. Mo, Xiaoqun, and X. Susan Sun, 2013, Soy protein plywood adhesives: formulation and characterization, J of Adhesion Science and Technology, 27(18-19):2014-2026.
28. Ahn, B. Kollbe, Jonggeun Sung, Namhoon Kim, Stefan Kraft, and Xiuzhi Susan Sun, 2012, UV-curable pressure-sensitive adhesives derived from functionalized soybean oils and rosin ester, Polymer International, DOI: 10.1002/pi.4420.
29. Ahn, B. Kollbe, Jonggeun Sung, Yonghui Li, Namhoon Kim, Nihar Mohanty, Myles Ikenberry, Phong Nguyen, Keith Hohn, Vikas Berry, and Xiuzhi Susan Sun, 2012,

Synthesis and characterization of amphiphilic reduced graphene oxide with epoxidized methyl oleate, Advanced Materials, 24:2123-2129.
30. Huang, Hongzhou, Alvaro I. Herrera, Zhiping Luo, Om Prakash, Xiuzhi S. Sun, 2012, Structural transformation and physical properties of a hydrogel forming peptide studied by NMR and TEM, Biophysical Journal, 103: 979-988.
31. Ahn, Byung-Jun; Kraft, Stefan; Sun, Xiuzhi, 2012, Solvent-free acid-catalyzed ring opening of epoxidized oleochemicals using stearates/stearic acid, and its applications, J Agriculture and Food Chemistry 60:2179-2189
32. Yan, S., X. Wu, J. Faubion, S. Bean, L. Cai, Y-C. Shi, X.S. Sun, and D. Wang. 2012. Ethanol production performance of ozone treated tannin grain sorghum flour. Cereal Chem. 89 (1):30-37.
33. Li, Yonghui, Xiuzhi Susan Sun, 2011, Nanocomposites of poly(lactic acid) and surface grafted MgO nanoparticles: preparation and characterization, J. Biobased Materials and Bioenergy, 5:452-459.
34. Sun, Xiuzhi Susan, 2011, Soy Protein Polymers and Adhesion Properties, J Biobased Materials and Bioenergy, 5: 1-24
35. Wu, X., J. Markham, X.S. Sun, and D. Wang. 2012, Optimization of catalytic fast pyrolysis of biomass for hydrocarbon yield. Transaction of the ASABE, 55(5):1879-1885.
36. N. Li, G. Qi, X.S. Sun, and D. Wang. 2012. Effects of sodium bisulfite on the physicochemical and adhesion properties of canola protein fractions. J. Polymers and Environment, (2012) 20:905-915.
37. Qi, G., N. Li, D. Wang, and X.S. Sun. 2012. Physicochemical properties of soy protein adhesives obtained by in situ sodium bisulfate modification during acid precipitation. AOCS Oil Chemistry 89 (2):301-312.
38. Li, N., G. Qi , X. S. Sun, M. J. Stamm, D. Wang, 2012, Physicochemical properties and adhesion performance of canola protein modified with sodium bisulfite, Journal of American Oil Chemists' Society, 89: 897-908
39. Li, Yonghui, Caihong Chen, Jun Li, Xiuzhi Susan Sun, 2012, Isothermal Crystallization and Melting Behaviors of Bionanocomposites from Poly(lactic acid) and TiO_2 Nanowires, J of Applied Polymer Science, 124:2968-2977,
40. Ahn, B. Kollbe, Hongwang Wang, Shona Robinson, Tej B. Shrestha, Deryl L. Troyer, Stefan Bossmann, Xiuzhi Susan Sun, 2012, Ring opening of epoxidized methyl oleate using novel acid functionalized iron nanoparticle catalyst, Green Chemistry, 14: 136-142.
41. Ahn, B. Kollbe, Jonggeun Sung, Xiuzhi Susan Sun, 2012, Phosphate esters functionalized dihydroxyl soybean oil fackifier of pressure-sensitive adhesives, J of American Oil Chemistry, 89:909-915
42. Pena, L, M. Ikenberry, B. Ware, K. L. Hohn, D. Boyle, X. S. Sun and D. Wang, 2011, Cellobiose hydrolysis using acid-functionalized nanoparticles, Biotechnology and Bioprocess Engineering, 16(6), 1214-1222
43. B. K. Ahn; S. Kraft; D. Wang; X. S. Sun. Green synthesis and characterization of pressure sensitive adhesives from functionalized soybean oils. *Polymer Preprint*. 2011, 52.1, 76-77
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9. IMPACT AND NEWS MEDIA

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3. Below is the link to a video on posted on Youtube - 2 min animation video of PepGel for k-12 educational outreach effort, part of the Innovation Festival display.

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   https://www.k-state.edu/media/newsreleases/nov14/hydrogelpatent11414.html

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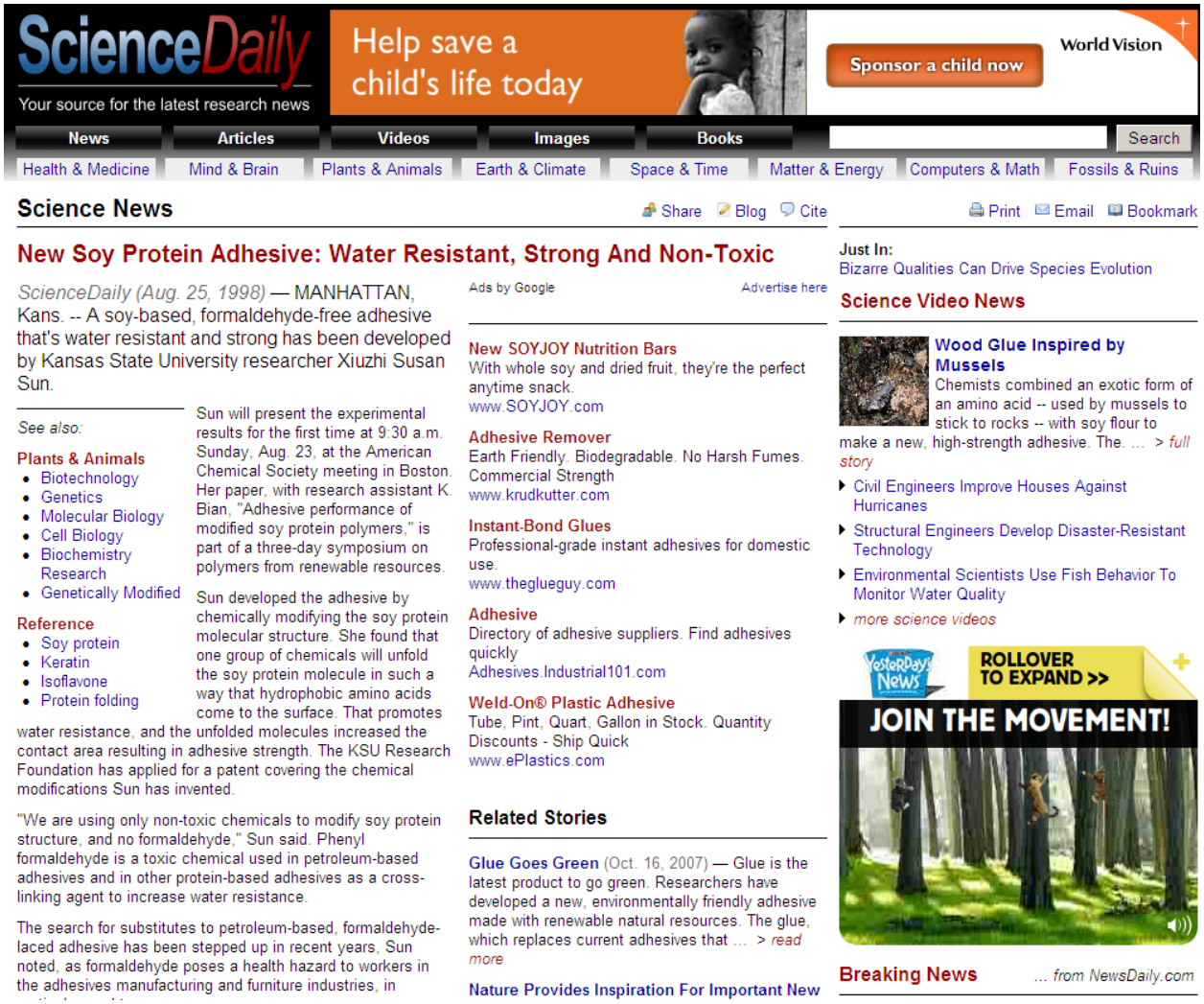
11. APPENDIX – a few examples of citations.



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Dear Dr. Sun:

Please accept the enclosed copy of *New Scientist* with our thanks. In this week's issue you will find that we describe some of your work or report your views. We would like to thank you for helping our reporters and editors--we rely on scientists around the world to bring out *New Scientist* each week.

If you are not familiar with *New Scientist*, I should explain that it is one of the world's most popular international weekly science and technology magazines. We have 650,000 plus readers world-wide, with the largest group of them active scientists working in research laboratories. *New Scientist* has been a big success in Britain for over forty years, and has grown into a global enterprise with editorial offices in Washington DC, San Francisco, London, Brussels, Sydney and Melbourne.

The magazine and its writers have won more than 40 major awards, including the *American Society for Microbiology's* Public Communications Award in both 1997 and 1998, and the *American Institute of Physics* Science Writing Award in 1997.

We hope you like this week's issue. If you wish to post any *New Scientist* material describing your work on your own website, please contact Barbara Thurlow on newscidc@idt.net. We will e-mail you a text version of the relevant articles. We would appreciate a link from the article back to our own website at *www.newscientist.com*.

Once again, many thanks for your help.

Yours sincerely,

Alun Anderson

Alun M Anderson PhD
Editor

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Let battle commence

The fight to establish a standard for electronic books has begun

PUBLISHERS are up in arms about a proposal by Microsoft to use an electronic book format developed for the Internet. With many publishers supporting a rival, higher-quality format, an industry-wide agreement is needed to avert a damaging Betamax versus VHS-style standards war.

The text of some books has been readable on computers for some years. But manufacturers are beginning to produce hand-held devices, dubbed e-books, into which such text is downloaded, and paid for, via the Internet. E-books have several advantages over old-fashioned paper books: some are backlit and can be read in the dark, you can annotate and search for your favourite passages, and some let you change the type size.

Unlike computers, however, e-books will only be able to cope with one file format. Microsoft wants to use a format based on HTML, the language used for Internet documents. But other companies would rather adopt the Portable Document Format (PDF) standard for electronic documents developed by Adobe Systems, which is already widely used in the publishing industry.

Last month, NuvoMedia of Palo Alto, California, launched the "Rocket eBook", a reader based on HTML. The paperback-sized device has enough memory for 4000 pages of text and sells for $499. Other companies are launching rival versions, but without a standard electronic file format from the outset, consumers may be afraid to commit early to a format that could become obsolete.

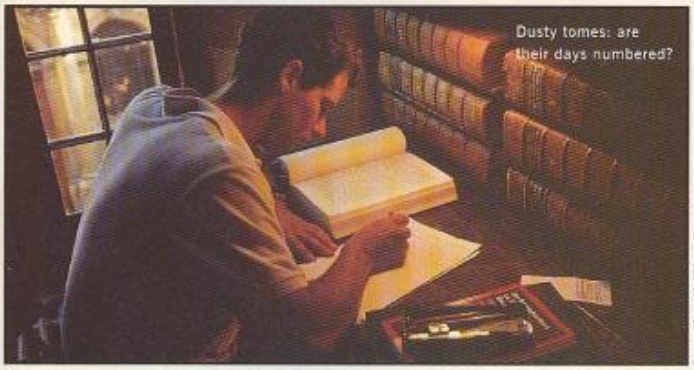
Microsoft wants to use XML—an extended version of HTML ("A new dawn", *New Scientist*, 30 May, p 34). This is an open, non-proprietary standard set by the non-profit making World Wide Web Coalition. The advantage of using XML is that e-books would be compatible with Web browsers and they would also allow readers to make changes such as marginal notations.

"The goal is to create as many titles as possible, and win as many customers as possible—as fast as possible," says Dick Brass, the Microsoft vice-president who is leading the company's efforts to establish an e-book standard. "The idea is to get e-books off the ground."

While NuvoMedia backs Microsoft's plan, others are pushing for the PDF format. PDF is a proprietary but open format owned by Adobe: anyone can write and sell a program that can read PDF files, but Adobe holds the rights to programs that create PDF format documents. That means Adobe would get a licensing fee from anyone publishing text for an e-book.

But Daniel Munyan, chief executive of Everybook of Middletown, Pennsylvania, which plans to launch an e-book, says PDF not only has technical advantages over HTML, but is already the *de facto* standard in the publishing industry. Many paper publishers already use the PDF format. This means they have a lot of titles that are ready to be sold as electronic books with minimal changes.

"It's important that the publishers set the standard," Munyan says. PDF is a high-quality format that exactly reproduces a document's original layout and should look better on an e-book screen. But Joe Sachs, chief executive officer of Softbooks, says PDF files are too big, and are difficult to format to a small screen. **Kurt Kleiner**, Washington DC



Dusty tomes: are their days numbered?

Stuart Franklin/Magnum Photos

TECHNOFILE

It's behind you!

When the "prequel" to George Lucas's *Star Wars* saga, *The Phantom Menace*, hits cinemas next year it should sound good even to people at the back of the cinema. The existing Dolby cinema sound system provides six channels of sound: one from the centre of the screen, a pair from speakers to the left and right of the screen, a pair to the rear, and one that drives a low-frequency woofer for special effects. Dolby's new Surround EX format squeezes an extra channel into the same 320 kilobits per second data stream, which will be used to provide sound from the rear-centre of the auditorium.

Bug hunter

The detection of bacterial contamination has been automated by British company Biotrace. Its portable, oven-sized instrument, called Auto-Track, detects microbes in samples of liquid or air using firefly luciferase, an enzyme that glows when it comes into contact with a cell's energy-storing ATP, as used in an earlier prototype (Technology, 16 November 1996, p 22). The technique has now been made 100 times more sensitive by detecting adenosine kinase, an enzyme which cells use to build ATP. Auto-Track, which costs around £20 000, takes three to eight minutes to register contamination. It can be programmed to initiate a response—such as injecting a biocide into a pulping tank at a paper mill or beginning a wash cycle in the pipes of a dairy.

Stuck up

A strong, water-resistant glue made from soya beans has emerged as a cheap, less damaging alternative to fume-producing glues derived from petroleum products. Xiuzhi Sun of Kansas State University, Manhattan, chemically modified soya protein so that it partially unfolds, allowing hydrophobic regions to come to the surface of the molecule and make the glue water-resistant. She found that when the glue is used as a wood adhesive the joint is stronger than the wood itself. And after three cycles of soaking for 48 hours and drying for 48 hours, 90 per cent of its strength remained.

proteins, to modify wheat- and potato-based resistant starch.

KSURF obtained a patent in 1999 on the technique Seib and graduate research assistant Kyungsoo Woo developed to modify plant-based starches to resist digestion. The patent covers starch derived from cereal grains, roots, tubers and legumes; for example wheat, corn, oats, rice, potato, tapioca and mung beans.

Essentially, when their resistant starch is mixed with flour, it will turn a baked food like bread, cookies or crackers into an indigestible fiber. MGP Ingredients Inc. of Atchison, Kan., obtained KSURF's approval to commercialize the technique in 2004.

Seib plans to retire in 2006 after 36 years on the faculty. He credits his major professor at Purdue University, Roy Whistler, as being his personal mentor for teaching him the rigors of performing scientific research. Whistler is now 94.

"I worked in Whistler's lab where we studied carbohydrates. He was responsible for a lot of the work ethic that I learned," Seib said. He also credits longtime grain science department head Charles Deyoe, one of KSURF's earliest inventors, as another role model.

That work ethic has helped Seib earn 21 patents during his career.

Inventor of a biodegradable plastic made from soy starch, Susan Sun believes her discovery is an environmentally friendly alternative to petroleum-based plastics, especially as the cost of oil continues to rise.

AN AGRICULTURE ENGINEER

in K-State's grain science department, Sun grew up in northeast China in the region once known as Manchuria. As a girl, she was intrigued by how things are assembled. So when her sister received a radio as a wedding gift, Sun took it apart to learn how it worked.

"My sister got upset with me when I couldn't put it back together," Sun recalled with a laugh. "I enjoyed reading about the lives of inventors like Thomas Edison and how he made the light bulb and sound recording."

This childhood quest for discovery helped mold another of K-State's scientific investigators who has received five patents. They include patents for developing nonpetroleum plastic with Seib that is biodegradable and for several types of nontoxic, nonformaldehyde adhesives like children's play glue, industrial furniture glue and foundry glue.

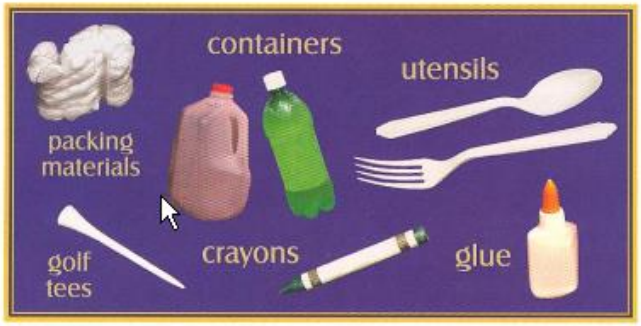
"My objective as a researcher is to make Kansas grain farmers richer by finding new uses for their products," said Sun who joined the faculty in 1996.

As the cost of petroleum reaches historic highs and the environment is threatened, her work in soy plastics has particular significance.

She explained that different petroleum plastics degrade in 10 to 20 years or longer. Sun's starch plastic reenters the environment in six months to a year. Things used one time and thrown away, like packaging containers or picnic spoons and forks, are prime candidates for Sun's new plastic.

"We are in a transition age where the supplies of petroleum are getting smaller," she said. "Environmental pollution from petroleum-polymer wastes and volatile hazardous chemicals is a severe global problem."

Agriculture produces more than food!



What other kinds of usable items do you think could be made with grains and oil seeds?

Dr. Xiuzhi Susan Sun

Renewable Resources Scientist

It is Dr. Sun's job to discover major products using the commodities we grow in Kansas. She has been working on the science of agriculture since she was a girl in China. From healthy bread to fast food packaging, she says, "Our quality of life connects with agriculture."

Dr. Susan Sun

Dr. Sun enjoys finding ways to meet the needs of people while using the renewable resources that farmers grow.

"I feel it is my mission to add value to farm products and ease the environmental problems." Grain-based glue is a favorite project of hers.

Dr. Sun has also worked on plastic bottles, packing peanuts, crayons, golf tees, plastic wear and credit cards!

What's in a Bushel?

One bushel of corn = 60 pounds.

What can we get from a bushel of corn?

32 pounds of starch

or

33 pounds of sweetener

or

2.8 gallons of ethanol fuel

and

11.5 pounds of gluten feed

and

3 pounds of gluten meal

and

1.5 pounds of corn oil.