

CURRICULUM VITAE

Albert P. Kausch, Ph.D.

Professor
Department of Cell and Molecular Biology
University of Rhode Island

&

Founder and President
The New England Biophilia Institute LLC

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Albert Kausch is a plant biologist. He is also known as a molecular biologist, a geneticist, botanist, cell and developmental biologist, a professor, an innovative educator, lecturer, inventor, scientist, poet, author, editor, biological illustrator, electron microscopist, biophilist and lifeist entrepreneur, futurist, storyteller, biotechnologist, and agriculturalist.

Dr. Kausch has been a Doctoral and Post-Doctoral Researcher; Research and Senior Research Scientist; Adjunct, Visiting, Assistant, Associate and Full Professor; Undergraduate and Graduate Advisor; a Professional Consultant Expert Witness; Founder, Co-founder, Scientific Advisory Board Member, and Board Member for several companies and a nonprofit. He has also been involved with Industry, Startups, Government and Academics, Research, Education, and Outreach.

Areas of Major Expertise

Agricultural Biotechnology
Advanced Crop Breeding
Plant Transformation and Genome Editing
New Crop Varietal Development
Biofortification in Crop Plants

Large CEA for Sustainability
Breeding for CEA Specific Crops
CEA Education and Training

Development of Materials for Science Education and Training
Large Online Science Education
Applications of AI in Education and Training

Agriculture and Biotechnology Consulting
Educational Materials Development Consulting
The Biophilia Response GPSHE Founding Director

Dr. Albert P. Kausch

Biographical Sketch

Dr. Albert Kausch is a Professor at the University of Rhode Island in the Department of Cell and Molecular Biology with a research focus on molecular improvement and gene discovery in plants. His major educational interests have concentrated on the development of science curricula for teaching general biological sciences biotechnology and agriculture. After completing a Master's and Ph.D. in Molecular, Cellular and Developmental Biology at Iowa State University, Dr. Kausch accepted an NIH Postdoctoral Fellowship at The Rockefeller University in New York working in the laboratory of Dr. Anthony Cashmore on early gene transfer methods to plants and chloroplast protein transport. People often comment that "he did not make the first transgenic plant...but perhaps he made the fifth one." Dr. Kausch did his postdoctoral work in collaboration with Dr. Marc van Montague's laboratory in Ghent, Belgium, where they conducted seminal research on plant transformation and chloroplast protein targeting in transgenic plants. That work resulted in several landmark publications and four international patents. This technology is now utilized in all commercial varieties of Round-up Ready plants, which includes transgenic maize and over ninety percent of last year's US soybean crop.

He then joined the plant molecular biology group with Pfizer-DeKalb Genetics Corp. Inc., to work on gene transfer technologies for genetic engineering of corn. During that time, Dr. Kausch worked with a team that developed the first published results of genetically modified corn plants. He has directed diverse research areas in agricultural biotechnology on corn, rice, sorghum, switchgrass, alfalfa and other crop plants for traits including herbicide and insect resistance, drought tolerance and yield stability, nutritional improvement, gene regulation, transformation technology development, site specific recombination systems (and a range of other projects). Albert Kausch has over thirty years of experience in commercial and academic research in agricultural biotechnology. His broad industry experience includes startup company development, consulting, management, research, expert witness, intellectual property rights and patents, licensing, regulatory affairs, marketing and public perception. He maintains several active research collaborations world-wide on genetic modification, breeding, genomics and gene editing of crop plants.

Dr. Kausch has extensive academic experience including several concurrent positions. He has taught at Mount Holyoke College, The University of New Hampshire, The University of Connecticut, Connecticut College, and the University of Rhode Island, where he currently teaches. Dr. Kausch has developed a unique course covering the many diverse fields of biotechnology for a general audience. His course is one of the most popular courses on campus and he even enjoys top ratings from the students on ratemyprofessors.com (4.6). This general education course for undergraduates is titled *Issues in Biotechnology: The Way We Work With Life* and has enrolled over 700 student per semester. He has been affiliated with URI for over 25 years.

Dr. Kausch's research program has been highly successful. During his appointment at the University of Rhode Island, Dr. Kausch has received over \$32 million in support from federal grants (DOE, USDA, NSF, and the Bill and Melinda Gates Foundation). Dr. Kausch has also received funding for his research from Industry sources (Amgen, Pfizer, HybriGene, John Deere, Scotts Co., HybriGene, Delta Pine and Land Co., Monsanto Co., EPIC Wisconsin Inc., Bayer Crop Science, and Tee-Green Corp.). Dr. Kausch has collaborated with many scientists in his field from many institutions including (currently) Yale Univ., Stanford Univ., Univ. of Calif. Berkley, MIT, Univ. of Minnesota, Washington State Univ., Univ. of Illinois, Univ. of Wisconsin-Madison, and Iowa State University. He is currently serving as a Consultant and Scientific Advisor for various Agricultural Venture Capital firms, Biotechnology companies and Law firms.

Dr. Kausch has been involved with the development of seven agricultural biotechnology startup companies and an educational nonprofit organization that are related to his work. For example, Dr. Kausch developed a new variety of garlic through conventional breeding which grows like a scallion but is a garlic variety, consumed as a green vegetable with one-quarter the strength of clove garlic, as a new vegetable called 'Baby Green Garlic'. This variety was selected from wild germplasm and is now being developed commercially as a new vegetable. He received four issued patents and launched a new company called Ophios. The Green Garlic product remains open for development. This is only one of many projects in the queue.

As Director of the Plant Biotechnology Laboratory at the University of Rhode Island, Dr. Kausch has formed many collaborations with molecular biologists in industry, academics and government. The Plant Biotechnology Laboratory is fully equipped for plant transgenic technology applications and molecular biology and is available to provide the necessary laboratory facilities required for the program. The PBL comprises more than

5700 sq ft of research and teaching laboratory space that is fully equipped for plant transgenics, gene editing, and molecular biology. He has mentored and trained scores of interns in his laboratory over the past two decades.

Dr. Kausch developed a highly influential General Education undergraduate course for majors and non-majors titled Issues in Biotechnology 190. This has been a very popular course at the University of Rhode Island over the past fifteen years, enrolling over 700 students per semester, and has been introduced into High schools and Nursing programs for College Credit through the University of Rhode Island.

Dr. Kausch has recently (04-10-2021) produced four complete University level courses that are ready for immediate and broad dissemination, enrollment and offering including *Issues in Biotechnology*; *Understanding COVID-19: Biology and Issues*; *Agriculture and Biotechnology*; and *CEA Controlled Environment Agriculture and The Future of Food*. Dr. Kausch is the sole author and creator with all copyright, trademark, IP and NFT rights Exclusively Reserved. He is currently pursuing Advanced Platforms for eLearning including the synergistic use of advanced AI, VR and AR technologies and programming for educational learning platforms.

Albert Kausch is Founder and President of The New England Biophilia Institute. The New England Biophilia Institute (biophiliainstitute.com and biophiliaistitute.org) has developed three areas: (1) The production and distribution of materials supporting OMO AR Driven science education at all levels, particularly with a biophilia thematic orientation; (2) Consulting, specializing in all areas of agriculture and innovative online science education; and (3) Maintenance of a close relationship with the nonprofit Biophilia 501(c)(3), formerly known as *Lifeedu*, since 2003. The first two areas constitute the for-profit space of the Institute.

Dr. Albert Kausch lives in Charlestown, Rhode Island

I. Personal History and Professional Experience

A. Education

Ph.D. in the Molecular, Cellular, and Developmental Biology Program and The Department of Botany, 1983. Iowa State University, Ames, IA.

M.S. in the Molecular, Cellular, and Developmental Biology Program and The Department of Botany, 1980. Iowa State University, Ames, IA.

Bachelor's degree in Biological Sciences, 1978. State University New York, Oswego.

B. Academic and Industry Positions since Final Degree

National Institute of Health Postdoctoral Fellow: Department of Cell Biology, The Rockefeller University, New York City, NY, 1983-1987. In collaboration with Dr. Marc van Montague's laboratory; University of Ghent, Ghent, Belgium, and the University of New Hampshire.

Visiting Professor: Department of Biological Sciences, Mount Holyoke College, South Hadley, MA, 1987-1988.

Research Scientist: Pfizer, Inc/ DeKalb Genetics, Plant Molecular Biology, 1988-1990.

Senior Research Scientist: DeKalb Plant Genetics, Maize Transformation Discovery Research, 1991-1993.

Senior Project Leader: DeKalb Plant Genetics, Transgenics Technology Development, 1993-1998.

Associate Professor: Dept. of Plant Science, University of Connecticut, 1997-1998.

Vice President/Director of Research, HybriGene, Inc., West Kingston, RI & Visiting Professor, Dept. Plant Science & Department of Biochemistry, Microbiology, and Molecular Genetics (BMMG) at the University of Rhode Island, South Kingston, RI. 1998-1999.

President and Founder of biophiliaedu.org (formerly *Lifeedu*); 1999-2004.

Full Professor: Dept. Cell and Molecular Biology, University of Rhode Island, South Kingston, RI. 2004-Present.

C. Concurrent Academic Appointments*

* Summary of Concurrent appointments: Throughout full-time employment in various industry positions, Dr. Kausch maintained several active academic commitments. He served as a Visiting Professor at the University of New Hampshire (1986-1987) and at Connecticut College (1992-1997), teaching botany and plant developmental biology, and as an Undergraduate Research Independent Studies Advisor. During that time, he developed an undergraduate internship program at DeKalb Genetics Corporation involving students from various institutions. He also taught and served on several graduate thesis committees at the University of Rhode Island. Dr. Albert Kausch is currently a Full Professor at the University of Rhode Island in the Department of Cell and Molecular Biology (CMB) in the College of Environment and Life Sciences (CELS). Dr. Kausch held these positions concurrently while maintaining his full-time commitments to his other academic and industry positions.

Visiting Professor: University of New Hampshire, Department of Botany, Durham, NH, 1987.

Visiting Professor: Connecticut College, Department of Botany, New London, CT, 1992. (Taught Plant Structure and Function Botany 226).

Adjunct Professor/Student Internship Advisor: Connecticut College, Department of Botany, New London, CT, 1990-2000. (Advisor for 12 Independent studies students).

Visiting Professor: Connecticut College, Department of Botany, New London, CT, 1995, 1997. (Taught Botany 491: Plant Biotechnology 382).

Adjunct Professor/Ph.D. Advisor: University of Rhode Island, Department of Botany, South Kingston R.I., 1991-1997 (Graduate Advisor and Thesis Committees).

Adjunct Professor: University of Rhode Island, Department of Biochemistry, Microbiology, and Molecular Genetics, South Kingston R.I., 1991-2004. (Graduate Thesis Committees and student mentoring).

Ig. Tech Inc. 1997. Co-Founder & Consultant, as a plant molecular biologist, for an effort to produce antibodies in plants for animal health care products.

HybriGene Inc. 1998-2004. Vice President/Director of Research, Gene Discovery and Genetic Improvement in Grasses and Cereal Crops.

Lifededu. 2001-2021. Founder and President. *Lifededu* is a 501(c)(3) nonprofit organization dedicated to the dissemination of educational materials related to biotechnology.

Ophios LLC. 2004-Present. Co-Founder, Chief Scientific Officer and Director of Research: An Agri-Food Production Company specializing in Fresh Green Garlic.

Plant Advancements LLC. 2009-2016. Co-Founder, in association with Ernst Conservation Seeds Inc., Plant Advancements, LLC was a renewable bioenergy company with a focus on the development and primary production of biomass for the growing bioenergy industries.

Verinomics Inc. 2016-2020. Co-Founder. (Founders Drs. S. Dellaporta, M. Moreno, C. Heffelfinger and A.P. Kausch). An Advanced Plant Breeding Company. Genomics, Genome Editing and Computational Biology.

The New England Biophilia Institute LLC. 2021-Present. Founder & President. Agricultural Biotechnology and CEA Technology Consulting; Innovative OMO-AR-AI-VR-Wiki-Enhanced Avatar Updated and Driven Educational Learning Platform Development, and Nonprofit Activities.

University of Rhode Island. *Present.* Full Professor Level III: University of Rhode Island, Department of Cell and Molecular Biology, South Kingston R.I.

D. NIH Post-doctoral Fellowship Research

NIH Postdoctoral Fellow: Laboratory of Dr. Anthony R. Cashmore, 1983-1986. Dept. of Cell Biology, Rockefeller University, 1230 York Avenue, New York City, NY. In collaboration with Dr. Marc van Montague's laboratory; University of Ghent, Ghent, Belgium.

Early work on Agrobacterium-mediated plant cell transformation and transgenic plant regeneration; Promoter dissection and analysis, **Light regulated gene expression** of nuclear encoded chloroplast proteins ([Nature 318:579-582](#)); Organelle isolation and physiology, protein targeting; **Post-translational import of polypeptides into chloroplasts**; Targeting of foreign proteins to organelles by chimeric genes encoding transit peptides ([Nature 313:358-363](#)). This work resulted in four major US patents on using the transit peptide for directing foreign proteins to chloroplasts in genetically engineered plants ([US Patent Number 5,728,925](#), [Number 5,717,084](#), [Number 6,063,601](#) and [Number 6,130,366](#)).

After completing a PhD in Molecular, Cellular and Developmental Biology at Iowa State University, Dr. Kausch accepted an NIH Postdoctoral Fellowship at The Rockefeller University in New York working in the laboratory of Drs. Anthony Cashmore, and Marc Van Montague at Univ. Ghent, Belgium on early gene transfer methods to plants and chloroplast protein transport. This was seminal research provided the basis for herbicide resistance.

Guido Van den Broeck, Michael Timko, **Albert P. Kausch**, Anthony Cashmore, Marc Van Montague & Luis Herrera-Estrella. 1985 Nature 313:358-363.

[Targeting of a foreign protein to chloroplasts by fusion to the transit peptide from the small subunit of ribulose 1,5-bisphosphate carboxylase](#)

These were among the first genetically engineered plants in the world 1983-85.

Timko, Kausch, Castresana, Fassler, Herrera-Estrella, Van den Broeck, Van Montague, Schell and Cashmore 1985. Nature 318:579-582.

[Light regulation of plant gene expression by an upstream enhancer-like element](#)

E. Teaching Experience

Iowa State University: Graduate Teaching Assistant (1978-1983)

Courses: General Biology Laboratory. General Botany. Morphology of Vascular Plants. Laboratory of Plant Cell and Tissue Culture. Plant Anatomy. Electron Microscopy I and II. Scanning Electron Microscopy and X-ray Microanalysis. Transmission Electron Microscopy. Plant Cell and Tissue Culture.

Mount Holyoke College: Assistant Professor (1987-1988)

Courses: Molecular Biology of the Cell; 1987. Laboratory for Molecular/Cell Biology; 1987. Plant Physiology; 1987. Electron Microscopy for Biology; 1988.

Undergraduate Thesis Research Advisor: Senior Honors Thesis student: Cynthia J. Grondin; 1988. Tissue specific localization of bromelin in *Ananas comosus*. Research supported by a grant from Del Monte Corp.

Connecticut College: Visiting and Adjunct Professor (1992-1997)

Courses: Plant Structure and Growth, 1992. Laboratory for Plant Structure and Growth, 1992. Developmental Plant Biology, 1994. Special Topics in Botany: Plant Biotechnology, 1995. Current Topics in Botany: Plant Biotechnology, 1997. Issues in Biotechnology, 2002. Pfizer Corporation Sponsorship.

Undergraduate Research Independent Studies Advisor, Connecticut College (1992-1997). Dr. Kausch has served as an undergraduate research advisor for nineteen students from Connecticut College. Four have been co-authors on reviewed journal publications, and seven went on to work in life sciences or in graduate school.

University of Connecticut: Associate Professor (1997-1998)

Courses: Modern Techniques in Plant Biotechnology, Laboratory and Lecture. 1997-1998.

F. University of Rhode Island: Professor (Present)

Innovative Program Development

Invented and developed a General Education course on modern biotechnology (Issues in Biotechnology 190) designed for majors and non-majors for both on campus and online delivery. Enrollment reached over 700 students per semester in Spring 2017. This course also has involved seven High Schools in Rhode Island for over fifteen years where students receive (3) college credits from URI.

Current Courses Taught at the University of Rhode Island

AFS 190, CMB 190, NRS 190, PLS 190 Section 100200 Online Issues in Biotechnology, 2005-Present. (632 enrolled students Spring 2017, over 550 students Fall 2017).

AFS 190, CMB 190, NRS 190, PLS 190 Section 100001 On Campus Issues in Biotechnology, 2005-Present. (70 enrolled students Spring 2017; 53 enrolled students Fall 2017).

BCH 491/492 Independent Research in Biochemistry (an internship and mentoring program) Honors Colloquium Course. Origins: Life, the Universe and Everything (Fall 2017).

Examples of Teaching Contributions:

Issues in Biotechnology 190, Albert Kausch, Professor

Course description: The applications and developments in biotechnology are among the most provocative and socially relevant topics today. This course, *Issues in Biotechnology*, is intended for a broad audience; we include various majors and levels. *There are no prerequisites for this course.* This is not a course meant to 'weed out' biology majors or pre-med students, but rather to include the many perspectives on the broad ranging topics in biotechnology today.

This course has been enormously popular with the students, enrolling over 700 students per semester. This is an introduction to the course. [Orientation video on YouTube.](#)

Full Course available upon request.

The COVID Lecture Series: The Pandemic: The Biology Biotechnology and Social Impacts Albert Kausch, Professor

The COVID-19 pandemic has resulted in profound worldwide personal tragedy, loss, mourning and grief for all of us. This pandemic has brought pervasive and cataclysmic social, economic, and global health consequences, with more than 310 million cases and 3.5 million deaths. By any measure, the turbulent impact of the pandemic on global health, the world economy and this period of history will be a lasting and dark legacy. These impacts, and their ramifications, will continue long into the future. Future generations will be defined by it. And this situation may not be ended as soon as some hope, as past eradication campaigns demonstrate. This virus and its variants are now a global endemic. This course examines all aspects of the pandemic from primary source literature.

This course was borne out of pure frustration when confronted with the torrent of misinformation regarding the pandemic. This is an introduction to the course: [Orientation video on YouTube](#).

Full Course available upon request.

Issues in Agriculture and Technology, Albert Kausch and David Songstad, Professors

Humans invented agriculture. The origin of agriculture is widely understood as a crucial event in human history that has been truly one of the most significant and impactful for humanity. The accumulation of surplus food supplies correlates with all the other achievements of Neolithic civilization including writing, mathematics, philosophy, science, property law, and government. Now nearly all the plants, fruits, vegetables and grains available in our grocery store do not grow in the wild. All cultivated plants are the result of human intervention. Most of these plants would not exist if not for humans and would not persist without them. The development of plant cultivation for food by humans has grown increasingly sophisticated, starting with selection of wild plants and domestication, to the use of genetics, hybrid plant development, directed crosses, wide crosses and the use of mutagenesis and polyploidy, and now more recently, the application of genomics, bioinformatics, association genetics, marker assisted breeding, advanced tissue culture, modern conventional genetics and transgenics. This course examines the history, technology and ethics of modern agriculture.

Other courses taught at the University of Rhode Island

AFS 190, NRS 190, PLS 190, MIC 190 and BCH 190 Issues in Biotechnology. Fall 2001-2005
PLS 481/482 Modern Techniques in Genetic Engineering Fall 2002/Spring 2003, Fall 2004/2005
PLS 492/592 Molecular analysis of transgenic plants. Spring 2000.
PLS 491 Special Topics in Plant Science: Plant Biotechnology and Agriculture. Spring 1999
PLS 491/591 Gene Transfer to Plants. Fall 1999.
Special Topics in Plant Science: Plant Biotechnology and Agriculture. Spring 1999
BMMG Plant Transgenics Internships (funded by DeKalb Genetics Corporation). Spring 1997
BMMG Plant Transgenics (funded by DeKalb Genetics Corporation). Spring 1993-1995

Curriculum Improvement: New Courses

AFS 190, PLS 190, MIC 190 and BCH 190 Issues in Biotechnology. Fall 1999, Fall 2000/Spring 2001, Spring 2003, Fall 2004, Spring 2005, Summer Session 2005, Fall 2005 Development of online classes and distance learning. This is now a General Education course at URI.

Modern Techniques in Genetic Engineering PLS 481/482 Fall 2002/Spring 2003, Fall 2004/Spring 2005.

URI Internship program on plant biotechnology CMB 491/492, F/S 2001, F/S 2002, F/S 2003, F/S 2004, F/S 2005-Present

URI Graduate MS and Ph.D. Thesis Committees

Dr. Kausch has served on eight Ph.D. committees, and seven MS committees for the University of Rhode Island and played an active role in graduate and undergraduate student research (all names, dates and thesis titles available on request).

John Longo, University of Rhode Island, Department of Cell and Molecular Biology, South Kingston, RI, 2003-2006 Transposon Mutagenesis in Rice.

Joel Hague, University of Rhode Island, Department of Cell and Molecular Biology, South Kingston, RI, 2003-2004 Developmental Analysis of the Maize Pollen Specific Promoter.

Adam Deresienski: Methods for Producing Wide Crosses in *Panicum* Species; John Ventura: Analysis of ts1 Mutations in Rice; Jaiyin Liu, Control of Male Fertility in Transgenic Sorghum. 2019-2020.

G. Grants: Recent, Current and Pending Support (1999-2017 only) *

Current Funded Grants (total current funded grants \$18,645,422)

DOE BER Grants Program titled: "Genetic Improvement of Sorghum for Bioenergy Traits," PI: Baxter, Ivan; Co-PIs Albert **Kausch**; Bernds, Melanie; Sue Rhee; José Dinneny; Andrew Leakey; Mockler, Todd; Quemada, Hector; Asaph Cousins; Dan Voytas. \$16,563,784 09/01/17-08/31/2022 (five-year renewal pending with a \$31,563,784 budget) in collaboration with The Donald Danforth Plant Science Center St. Louis, MO.

NSF Plant Genome Grant titled: "Transforming Cereal Genomics: Tooling Up for Empowered Crop Phenotyping Platforms," \$2,081,638. PI: **Albert Kausch**; Co-PIs Zhanyuan Zhang, Maria Moreno and Stephen Dellaporta. 9/01/2015- 08/31/2021 (extended to 08/31/22). University of Rhode Island, Yale University and University of Missouri.

Funded Grants

Bill and Melinda Gates Foundation Grant titled: "Hybrid Systems for Grain Improvement for African Germplasm," PI: Stephen L. Dellaporta, Yale University. Co-PI Joe Tohme, International Center for Tropical Agriculture (CIAT); Co-PI John Mottinger, Plant Biotechnology Laboratory, University of Rhode Island Co-PI **Albert Kausch**, Plant Biotechnology Laboratory, University of Rhode Island. \$1,200,000 01/01/14-06/30/15 Bill and Melinda Gates Foundation.

NSF BREAD Creativity Award titled: "Hybrid Systems for Cereals: A Model for Phase II NSF BREAD," Projects PI: Stephen L. Dellaporta, Yale University; Co-PIs Maria A. Moreno, Yale University; Joe Tohme, International Center for Tropical Agriculture (CIAT); Edgar Alonso Torres, CIAT; **Albert P. Kausch**, Plant Biotechnology Laboratory, University of Rhode Island; Cesar Pompilio Martinez, CIAT (retired from CIAT, consultant on project). \$2,500,000 National Science Foundation BREAD 11/30/13-11/30/15.

NSF BREAD NCE Grant Program with HarvestPlus Grant titled: "Hybrid Systems for Cereals," Stephen Dellaporta, **Albert Kausch**, Joseph Tome, and Cesar Martinez 11/01/09 - 06/30/12 \$150,000 11/01/12-06/30/13 Yale University, University of Rhode Island, CIAT.

USDA SBIR Grants Program Grant titled: "Hybrid Systems for Gene Confinement and Breeding of Perennial Plants Used for Biofuels." Thomas Hodges and **Albert Kausch** \$100,000 5/1/12-8/31/13.

NSF BREAD Grant Program with HarvestPlus Grant titled: "Hybrid Systems for Cereals," Stephen Dellaporta, **Albert Kausch**, Joseph Tome, and Cesar Martinez 11/01/09 - 06/30/12 \$1,500,000 11/01/09-06/30/12 Yale University, University of Rhode Island, CIAT.

HarvestPlus Grant titled: "Transgenic Products to Increase Carotenoid Levels in African Maize," Stephen Dellaporta, John Mottinger, **Albert Kausch**, Joseph Tome, and Cesar Martinez. HarvestPlus \$161,939 11/01/09 - 06/30/12 Yale University, University of Rhode Island, CIAT.

Department of Energy DOE BER Grant NCE titled: "Genetic Improvement of Switchgrass," (Award # DE-FG-36-08GO88070). **PI Albert Kausch** and C0-PI Richard Rhodes III \$123,084 11/30/14-11/30/14 University of Rhode Island.

Department of Energy DOE Grant titled: "Genetic Improvement of Switchgrass," (Award # DE-FG-36-08GO88070). **PI Albert Kausch** and C0-PI Richard Rhodes III \$5,523,084 7/01/08- 11/30/15 University of Rhode Island.

USDA-BRAG Biotechnology Risk Assessment Grant titled: "Development of controlled total vegetative growth for prevention of transgene escape from genetically modified turfgrass." 2006. H. Luo, **A.P. Kausch**, J. Chandlee, M. Oliver. \$399,982 01/01/06- 01/01/09.

USDA-CSREES titled: "Educating the Educators: With Further Advances in Agricultural Biotechnology Education Enrichment for the K-12 School Teachers," 2005 Jeff Adelberg; Richard Wallace; Carol M. Stiff; **Albert Kausch**; Bruce W. Wood. \$256,427 10/01/05- 05/01/07.

NRICGP-USDA Equipment Grant Program titled: "Infrastructure for Plant Biotechnology at URI." 2005 **Albert Kausch** and Hong Luo \$83,868.00 09/01/05- 09/01/06.

USDA Special Programs Grant titled: "Environmental Biotechnology at URI." J. Seemann, Paul Cohen, T. Bradley, M. Gomez-Chiarri, **A.P. Kausch**, T. Mather, and D. Nelson. 2005 \$572,604 09/01/05 09/14/06.

Corporate Sponsorships from Scotts Co., Delta Pine and Land Co., John Deere Co., Monsanto Co., EPIC Wisconsin Inc., HybriGene Inc., Bayer Crop Science, and Tee-Green Corp. Titled: "Gene Confinement for Genetically Modified Grasses." A Symposium co-sponsored by Yale University's Interdisciplinary Bioethics Projects, Yale University New Haven, CT and *Lifeedu* PI: **Albert Kausch** \$180,000 02/01/05-05/14/05.

Pfizer Foundation. Titled: "Production of a Distance Learning Course and Educational Materials on DNA, Genomics, and Current Topics in Biotechnology." PI: Albert Kausch and *Lifeedu* \$15,000.00 06/01/05 05/01/07.

NRICGP-USDA-Seed Grant Program. Titled: "Infrastructure for Plant Biotechnology at URI," 2004 Joel Chandlee, Hong Luo and PI: **Albert Kausch**. \$49,612 09/01/04- 05/01/05.

Rhode Island School-to-Career Strategic Focus & Core Elements of INVESTMENT 2004 Region II Southern Rhode Island Collaborative. Extending Student Internships in Biotechnology. Gerard Bertrand and PI: **Albert Kausch** \$25,000.00 06/01/04-08/28/04.

Slater Center for Marine and Environmental Biotechnology Program Phase I. Titled: "Ophios: An agricultural biotechnology company that specializes in production and development of hardneck garlic varieties." 2004. PI: **Albert Kausch** and C0-PI: Peter Sellw \$80,000 02/01/04- 05/01/07.

AMGEN Foundation Rhode Island. Titled: "Production of a Distance Learning Course and Auto-tutorial Educational Materials on DNA, Genetics, and Current Topics in Biotechnology." PI: Albert Kausch and *Lifeedu* \$98,000.00 08/30/04-05/14/05.

Pfizer Foundation. Titled: "Production of a Distance Learning Course and Auto-tutorial Educational Materials on DNA, Genetics, and Current Topics in Biotechnology." PI: **Albert Kausch** and *Lifeedu* \$50,000 09/07/03-09/07/04.

USDA-SBIR Program. Phase I Titled: "Use of site-specific recombination for hybrid rice production." 2003. PI: Albert Kausch, and Co-PI Hong Luo. \$75,000 06/01/2003- 09/30/2004.

Pfizer Foundation. Titled: "Initiation of a new nonprofit organization for the production and creation of educational materials on DNA, Genetics and Biotechnology: *Lifeedu*," PI: **Albert Kausch** and *Lifeedu*, 2003. \$50,000 05/01/2003- 09/30/2004.

Rose Environmental Biotechnology Undergraduate Student Internship Program. Titled: "Undergraduate Biotechnology Laboratory Experience." 2003. PI: **Albert Kausch** and Bill Rose. \$141,000 09/01/2003-09/30/2005.

Slater Center for Marine and Environmental Biotechnology Program Phase II. Titled: "Genetic modification for Turfgrass Improvement." 2003. PI: **Albert Kausch** and Bill Rose \$100,000 09/01/2003- 09/30/2005

Rose Environmental Biotechnology Undergraduate Student Internship Program. Titled: "Undergraduate biotechnology laboratory experience." 2002. PI: **Albert Kausch** and Bill Rose. \$143,000 09/01/2001-09/30/2003.

NRICGP-USDA-Seed Grant Program. Titled: "Stable expression of yeast FLP site specific recombinase in rice." 2001. PI: **Albert Kausch**, Joel Chandlee, and Hong Luo. \$74,945 09/01/2001- 09/30/2004.

HybriGene Inc. Corporate Sponsored Grant Award. Titled: "Infrastructure Development for Plant Biotechnology," 2000. PI: **Albert Kausch**, \$3,530,775 09/01/2001- 09/30/2005.

Rose Environmental Biotechnology Undergraduate Student Internship Program. Titled: "Undergraduate Biotechnology Laboratory Experience," 2001. PI: **Albert Kausch** and Bill Rose. \$113,000 09/01/2000-09/30/2004.

Slater Center for Environmental Biotechnology Program. Phase I Titled: "Genetic modification for Turfgrass Improvement." 2000. \$87,000 09/01/2000- 06-30/2003 PI: **Albert Kausch**.

AgriBiotech Inc. Corporate Graduate Student Fellowship Award. Titled: "Genetic Modification of Turfgrass." 2000. 09/01/2000- 12/05/2002 PI: **Albert Kausch**, \$153,700 Funding awarded to Chhandak Basu as a Ph.D. Grant.

USDA-Higher Education Challenge Grants Program. Titled: "Providing Undergraduate Experiential Learning Opportunities in Plant Biotechnology." Joel Chandlee, **Albert Kausch** and W. M. Sullivan \$88,000 1999.

NRICGP-USDA-Equipment Grant. University of Rhode Island. Titled: "Equipment request to strengthen infrastructure for plant biology research at URI," Joel Chandlee and **Albert Kausch** 1999. 09/01/1999-09/01/2001 \$84,610

The Champlin Foundations. University of Rhode Island. Titled: "The Environmental Biotechnology Initiative: Establishment of a Multi-User Facility for Transgenics Training and Research." Terry Bradley and **Albert Kausch**. 1999. \$149,409 09/01/1999-09/01/2001

* the author listed is the Principal Investigator

H. Agricultural Biotechnology Experience in Private Industry

Pfizer, Inc. Research Scientist (1988-1992). **Head of Plant Cell Culture/Corn Transformation**

Research team developed first genetically modified corn plants. Directed project to develop appropriate cell culture, gene transfer and selection system for transformation of corn. (US Patents [5,489,520](#) and [5,550,318](#)). Managed a team of nine research and technical assistants. Developed a project on magnetic separation of biomacromolecules, cells and organelles ([US Patent 5,508,164](#)).

DeKalb Genetics Corporation Senior Research Scientist (1992-1993) **Head of Yield Stability**

Managed team of nine full time employees. Yield Stability; Drought Tolerance; and Transformation Technology Development in Corn, developed project on drought tolerant maize by genetic engineering approaches with a research group of five research assistants ([US Patent 5,780,709](#); 1998).

DeKalb Genetics Corporation Senior Project Scientist (1993-1994) **Head of Transformation Technology Development**

Directed Transformation Technology Development in maize at DeKalb Genetics. Focus: Transformation development research in maize ([US Patent 6,281,411](#); 2001, [5,874,265](#); 1999 and [5,489,520](#); 1996) Established a program for Undergraduate Independent studies students and student internships between DeKalb Genetics, Connecticut College and the University of Rhode Island.

DeKalb Genetics Corporation Senior Project Leader (1994-1997) **Transformation Technology Development**

Gene targeting by site directed integration via Cre/Lox system; promoter and gene expression studies; gene silencing. Development of a promoter evaluation research project to study product gene expression in transgenic maize. Evaluation of CaMV 35S, aldolase, rice actin 1, and maize adh1. Developed educational materials and tours of the facility regarding biotechnology and gene transfer to corn.

I. Biotechnology Start-up Company Founder, Co-Founder and Other Involvements

Ig. Tech, Inc. Co-Founder & Consultant. 1997. Co-Founding member, as plant molecular biologist, for an effort to produce antibodies in plants for animal health care products. Raised over \$2.8 million in financing. Sold company to multi-nationals.

HybriGene Inc. 1998-2004. Vice President/Director of Research Gene Discovery and Genetic Improvement in Grasses and Cereal Crops. HybriGene Inc. is an agricultural biotechnology company focusing on genetic improvement in turfgrasses and cereal crops. Responsibilities included direction and management of the laboratory in West Kingston RI, licensing arrangements, patent preparation and intellectual property; grant (SBIR) and business plan writing. HybriGene has raised over \$6.2 million in financing. Designed transgenic laboratory for transformation of turf crops and exotic grasses and maintained direction of the Rose student internship program of undergraduates at URI. Responsible for hiring all scientific staff for molecular biology and plant transformation laboratory in West Kingston RI. Trait development and trait gene acquisition for crop improvement in alfalfa, forage, and cool-season turf species. Management of fifteen full time employees. Development of university and industry collaborations in the United States and Eastern Europe. Licensing of genes and technology. Development of University/Industry interactions and a collaborative internship.

Lifeddu 2001-Present. (Now NEBI). Founder and President. Lifeddu is a 501(c)(3) nonprofit organization dedicated to the dissemination of educational materials related to biotechnology.

Ophios, LLC 2004-Present. Co-Founder, Chief Scientific Officer and Director of Research: An Agri-Food Production Company specializing in Fresh Green Garlic. Established and invented a new vegetable called Fresh Green Garlic, patents issued and pending, commercial production in process. Sold company to large vegetable seed company.

Plant Advancements LLC 2009-2016. Co-Founder and Managing Director, in association with Ernst Conservation Seeds Inc., Plant Advancements LLC was a renewable bioenergy company with a focus on the development and primary production of biomass for the growing bioenergy industries.

Verinomics Inc. 2016-2020. An Advanced Plant Breeding Company Genomics, Genome Editing and Computational Biology. Co-Founder. (Founders: Drs. S. Dellaporta, M. Moreno, C. Heffelfinger and A.P. Kausch). As a recent Yale University Spinoff Company, using their proprietary advanced genomics and computational platforms makes possible advanced crop breeding through accelerated germplasm development and trait identification. Partnering in plant transformation and genome editing projects. Specializing in vegetable crops. The Company provides partners with a task-specific, integrated approach to crop improvement, utilizing proprietary genomic technologies, advanced computational biology, statistical analyses and advanced breeding strategies to generate new product varieties with PVP protection, rapidly and without gene modification. (**NOTE: Dr. Kausch stepped down from Verinomics, August 2021 to pursue activities in The New England Biophilia Institute, see below).**

The New England Biophilia Institute LLC. 2021-Present. Founder and President. Agricultural Biotechnology and CEA Technology Consulting: Innovative OMO-AR-AI-VR-Wiki Enhanced Avatar Updated and Driven Educational Learning Platform Development and Nonprofit Activities Associated with the Biophilia Project.

J. Selected Major Scientific Achievements and Contributions in Biotechnology

Demonstrated targeting of foreign proteins in transgenic plants. (Postdoctoral) Four major worldwide patents. This technology has been used in all Round-up Ready crops. Co-inventor on four major worldwide patents for the use of the transit peptide for targeting any foreign protein to chloroplasts in transgenic plants. US Patents [5,717,084](#), [5,728,925](#), [6,063,601](#), and [6,130,366](#). This technology is currently applied in all Round-up Ready and many Bt driven insect resistant plants (a total of over 140 million acres in the US, including cotton, wheat, rice, corn, and soybeans). These patents derive from work conducted during Dr. Kausch's postdoctoral at The Rockefeller University in collaboration with Plant Genetic Systems, Inc. and Marc Van Montague's laboratory in Gent Belgium.

Co-inventor on several major patents for corn transformation (US Patents [5,489,520](#) and [5,550,318](#)), these patents attracted world-wide attention and had a significant effect on DeKalb stock. This work focused on development of corn transformation by microprojectile bombardment and the production of herbicide resistant plants. Additional patents in transformation related areas resulted in a related family of IP.

Designed, organized, and coordinated an effort focused on several molecular approaches to Yield Stability (for example, see US patent number [5,780,709](#)) for traits including drought tolerance, chilling and freeze tolerance, salt tolerance and others in corn. Contributions as a co-inventor resulted in filed patent applications. Collaborated on projects related to enhanced Grain Quality.

Conceived, and developed early technology for biological magnetic separation technology. This work resulted in two issued patents. Procedures for large scale DNA insert isolation by triple helix magnetic affinity capture (Nucleic Acids Res. 1995, 19:26) resulted in a commercially produced kit marketed by Boehringer Mannheim. Inventor of technology and methods for immuno-isolation of biological materials including chromosomes and organelles ([US Patent 5,508,164](#)).

Designed five (5) Plant Transgenics Laboratory Facilities. Genetic transformation technology development in many species (maize, rice, tobacco, Arabidopsis, pea, rhododendron, alfalfa, and many turfgrass species) by many techniques (*Agrobacterium*-mediated gene transfer, biolistics, protoplast electroporation, silicon

carbide-mediated direct DNA uptake, and many others). Development of novel transformation methods for plants.

Designed and developed six (6) functional plant transformation laboratories.

Developed Green Garlic as a new vegetable. Kausch, A.P., and P. Sellev 2011 Green Garlic and Methods of Production. [US Patent 7,937,889](#) issued May 10, 2011.

Established a new breeding technology called in-situ embryo rescue for recovery of wide genetic crosses in switchgrass and other biofuels crops (2005-2013).

Developed a Research Group addressing the development of a commercialize-able approach to artificial photosynthesis for hydrogen production.

Selected as Task Force Chair for the Council for Agricultural Science and Technology (CAST) Policy Issue Paper on the **Applications, Benefits and Barriers of Gene Edited Crops**.

K. Awards

2018 Elected Chair of Education for the Society for In Vitro Biology

2017 University of Rhode Island Intellectual Property Recognition Award

2016 University of Rhode Island Intellectual Property Recognition Award

2016 Elected Chair of Education for the Society for In Vitro Biology

2015 University of Rhode Island Intellectual Property Recognition Award

2014 University of Rhode Island Intellectual Property Recognition Award

2013 Society for In Vitro Biology Distinguished Service Award

2013 University of Rhode Island Intellectual Property Recognition Award

2011 Massachusetts Horticultural Society Distinguished Scientist Award

2009 University of Rhode Island Innovator of the Year Award

2004 Historically Black Universities and Colleges Fort Valley State University Award: Educating the Educators

1996 DeKalb Genetics Corporation Patent Award for Innovation: Process of Producing Fertile Transgenic Zea mays Plants and Progeny Comprising a Gene Encoding Phosphinothricin Acetyl Transferase

1996 DeKalb Genetics Corporation Patent Award for Innovation: Isolation of Biological Materials Using Magnetic Particles

1983 Iowa State University Summa cum Laude Ph.D.

1980 Iowa State University Summa cum Laude MS

1978 State University of New York Magnum cum Laude BA

1978 State University of New York Martin V. Torok Outstanding Biology Student of the Year Award

L. Service (Previous Five Years Only)

2017-2019 Chair of the Education Committee, Society for In Vitro Biology

2017 Committee member and Coordinator for the Fall 2017 Honors Colloquium, University of Rhode Island.
Origins: Of Life, The Universe and Everything

2016-2017 Chair of the Education Committee, Society for In Vitro Biology

2017 Member of the Public Policy Committee, Society for In Vitro Biology

2016-Present Serving as an Academic Advisor for 22 URI Undergraduates

2021-Present Task Force Chair for Council for Agricultural Technology and Science CAST Policy Issue Paper on the topic, "*Applications, Benefits and Barriers of Gene Edited Crops.*"

M. Professional Outreach

Dr. Kausch is the Founder of The New England Biophilia Institute (formerly *Lifeddu*) which is an open-source creator of innovative OMO Driven Science Educational materials. Dr. Kausch has visited and been an invited speaker to hundreds of High School General Assembly lectures throughout the US and Canada. Five High School programs in Rhode Island implemented the *Lifeddu* site through the SIVB to teach Issues in Biotechnology to their students.

Dr. Kausch developed and hosted an NSF sponsored workshop on Plant Transformation in 2016. The workshop focused on the technology relevant to maize, rice and sorghum and was well attended. The deliverables of the workshop included an extensive workbook containing all relevant SOPs for these procedures, which has also been entered as a new website on the URI CELS site.

As Chair of the Education Committee for the Society for In Vitro Biology (SIVB), Dr. Kausch spearheaded a policy Statement to the USDA APHIS and the FDA (2017) regarding draft regulation concerning genome editing technology and its use in agriculture, medicine and pharmacy.

II. Publications and Creative Works

A. Thesis Titles

Ph.D., 1983. Development, physiology, and function of selected plant raphide crystal idioblasts. Iowa State University, Ames, Iowa.

M.S., 1980. A light and electron microscope study of the development and function of raphide crystal idioblasts in young leaves of *Typha angustifolia* L. Iowa State University, Ames, Iowa.

B. Published Micrographs and Illustrations

Kausch, A.P. Over 900 published, photographs, original pen-and-ink hand-drawn illustrations, scanning and transmission electron micrographs, and photomicrographs.

Dolphin, W.D. 1983. Biology. Wm. C. Brown Publ., Dubuque, IA.

Dolphin, W.D. 1983. Biology Laboratory Manual. Wm. C. Brown Publ., Dubuque, IA.

Recent. Kausch et al “Maize Transformation: History Progress and Perspectives Molecular Breeding,” Springer Nature. 2021.

C. Published Abstracts and Meeting Presentations

Dr. Kausch has published over 387 abstracts for meetings and poster presentations at state, national, and international conferences since 1980 (titles available on request).

D. Research Publications and Book Chapters*∞

*Dr. Kausch was restricted from publication as a Senior Research Scientist in his industry positions.

∞Selected High Impact Publications provided with brief personal descriptions and links.

1. **Kausch, A.P.**, J.L. Seago, and L.C. Marsh. 1981. Changes in Starch Distribution in the Over Wintering Organs of *Typha latifolia* (Typhaceae). *American Journal of Botany* 68:877-880.

This was my first publication, an ecological study, on Typha, from work I did when I was nineteen and an undergraduate. Dr. James Seago was one of my most profound Mentors and most significant botanical influences.

[Changes in Starch Distribution in the Overwintering Organs of *Typha latifolia* \(Typhaceae\)](#)

2. **Kausch, A.P.** and H.T. Horner, Jr. 1981. The relationship of air space formation and calcium oxalate crystal development in young leaves of *Typha angustifolia* L. (Typhaceae). *Scanning Electron Microscopy* III: 263-272.

Dr. Harry “Jack” Horner, my Ph.D. Advisor and Major Professor, would be another of my most profound Mentors and most significant botanical influences, he gave me the gifts of microscopy and seeing.

[Paper not available. Citation provided.](#)

3. Horner, H.T., **A.P. Kausch**, and B.L. Wagner. 1981. Growth and change in shape of raphide and druse calcium oxalate crystals as a function of intracellular development in *Typha angustifolia* L. (Typhaceae) and *Capsicum annum* L. (Solanaceae). *Scanning Electron Microscopy* III: 251-262.

4. **Kausch, A.P.** and H.T. Horner. 1982. A comparison of calcium oxalate crystals from callus cultures and their explant sources. *Scanning Electron Microscopy* I: 199-211.

5. **Kausch, A.P.** and H.T. Horner. 1983. The development of mucilaginous raphide crystal idioblasts in young leaves of *Typha angustifolia* L. (Typhaceae). *American Journal of Botany* 70:691-705.

6. **Kausch, A.P.** and H.T. Horner. 1983. The development of syncytial raphide crystal idioblasts in aerial roots of *Vanilla planifolia* L. *Scanning Electron Microscopy* II:893-903.

7. **Kausch, A.P.**, B.L. Wagner and H.T. Horner. 1983. Use of the cerium chloride technique and energy dispersive x-ray microanalysis to allow plant peroxisome identification. *Protoplasma* 118:1-9.

8. **Kausch, A.P.** and H.T. Horner. 1984. Increased nuclear DNA content during raphide crystal idioblast development in *Vanilla planifolia* L. *European Journal of Cell Biology* 33:7-12.

9. **Kausch, A.P.** and H.T. Horner. 1984. Differentiation of raphide crystal idioblasts in isolated root cultures of *Yucca torreyi* L. (Agavaceae). *Canadian Journal of Botany* 62 (7):1474-1488.
10. **Kausch, A.P.** 1984. The biogenesis and cytochemistry of unspecialized peroxisomes in root cortical cells of *Yucca torreyi*. *European Journal of Cell Biology* 34:239-247.
11. **Kausch, A.P.** and H.T. Horner. 1985. Absence of CeCl₃ detectable glycolate oxidase activity in developing calcium oxalate raphide crystal idioblasts of *Psychotria punctata* and *Yucca torreyi*. *Planta* 164:35-40.
12. **Kausch, A.P.** 1985. Peroxisomal enzyme cytochemistry by cerium precipitation. In: *Handbook for Plant Histochemistry*. K.C. Vaughn, Ed. CRC Press, Inc.
13. Timko, M., **A.P. Kausch**, L. Herrera-Estrella, G. Van den Broeck, M. Van Montagu, and A.R. Cashmore. 1985. The structure and expression of nuclear genes encoding polypeptides of the photosynthetic apparatus. In: *The Molecular Biology of the Photosynthetic Apparatus*. C. Arntzen, L. Bogorad, S. Bonitz, and K. Steinback Eds. Cold Spring Harbor Press.

Dr. Anthony "Tony" Cashmore, my Postdoctoral Advisor at The Rockefeller University, would be the third of the triad of my most profound Mentors.

14. L. Herrera-Estrella, G. Van den Broeck, M. Timko, **A.P. Kausch**, A. Cashmore, J. Schell, and M. van Montagu. 1985. The use of chimeric genes to study the light-inducible gene expression of chloroplast import of the small-subunit of ribulose-1,5-biphosphate carboxylase. In: *The Molecular Biology of the Photosynthetic Apparatus*. C. Arntzen, L. Bogorad, S. Bonitz, and K. Steinback, Eds. Cold Spring Harbor.
15. Van den Broeck, M.P. Timko, **Albert P. Kausch**, A.R. Cashmore, M. Van Montagu, and L. Herrera-Estrella. 1985. Targeting of a foreign protein to chloroplasts by fusion to the transit peptide from the small subunit of ribulose-1,4-biphosphate carboxylase. *Nature* 313:358-363.

This work resulted in several landmark publications and four international patents. This technology is now utilized in all commercial varieties of Round-up Ready plants, and many other chloroplast traits in biotechnology crops including maize, soybean, cotton, rice, sorghum and wheat.

[Targeting of a foreign protein to chloroplasts by fusion to the transit peptide from the small subunit of ribulose 1,5-bisphosphate carboxylase](#)

16. Timko, M.P., **A.P. Kausch**, C. Castresana, J. Fassler, L. Herrera-Estrella, G. Van den Broeck, M. Van Montagu, and A.R. Cashmore. 1985. Expression of RuBP carboxylase small subunit genes involves sequences with enhancer-like properties. In: *Plant Genetics, UCLA Symposia on Molecular and Cellular Biology, New Series, Volume 35* (ed., M. Freeling), Alan R. Liss, Inc., New York.
17. Cashmore, A., L. Szabo, M. Timko, A.P. Kausch, G. Van den Broeck, P. Schreier, H. Bohnert, L. Herrera-Estrella, M. Van Montagu, and J. Schell. 1985. Import of polypeptides into chloroplasts. *Bio/Technology* 3:803-808.
18. Pichersky, E., R. Bernatsky, S. Tanksley, R.W. Breidenbach, **A.P. Kausch** and A.R. Cashmore. 1985. Molecular characterization and genetic mapping of two clusters of genes encoding chlorophyll a/b binding proteins in *Lycopersicon esculentum* (tomato). *Gene* 40:247-258.

19. Timko, M.P., **A.P. Kausch**, C. Castresana, J. Fassler, L. Herrera-Estrella, G. Van den Broeck, M. Van Montagu, and A.R. Cashmore, 1985. Light regulation of plant gene expression by an enhancer-like element *Nature (London)* 318:579-582.

Plant researchers have commented that “he did not make the first transgenic plant...but he probably made the fifth...” Dr. Kausch did his postdoctoral work in collaboration with Dr. Marc van Montague’s laboratory in Ghent, Belgium, where they conducted seminal research on plant transformation and chloroplast protein targeting in genetically engineered plants.

[Light regulation of plant gene expression by an upstream enhancer-like element](#)

20. Smereka, K.J., W.E. MacHardy, and **A.P. Kausch**. 1987. Cellular differentiation of *Venturia inaequalis* ascospores during germination and penetration of apple leaves. *Canadian Journal of Botany* 65:2549-2561.

21. Smereka, K.J., **A.P. Kausch** and W. E. MacHardy. 1988. Intracellular junctional structures in the fungus *Venturia inaequalis*. *Protoplasma* 142:1-4.

22. Gordon-Kamm, W.J., T.M. Spencer, M.L. Mangano, T.R. Adams, R.J. Daines, W.G. Start, J.V. O'Brien, S.A. Chambers, W.R. Adams, Jr., N.G. Willetts, T.B. Rice, C.J. Mackey, R.W. Krueger, **A.P. Kausch**, and P.G. Lemaux. (1990). Transformation of maize cells and regeneration of fertile transgenic plants. *The Plant Cell* 2:603-618.

We made the first fertile GMO Corn in 1990. Globally now, genetically engineered corn is now a multibillion-dollar crop annually. Despite controversy, there has not been a single substantiated health consequence to GMO crops in three decades, and some say, ‘best invention since the plow’.

See [US Patent Office Number 5,969,213](#). Issued May 16, 2000. [US Patent Office Number 6,063,601](#). Number Assignee: DEKALB Plant Genetics US (Issued June 4, 2002) and others.

[Transformation of Maize Cells and Regeneration of Fertile Transgenic Plants](#)

23. Gordon-Kamm, W.J., T.M. Spencer, M.L. Mangano, T.R. Adams, R.J. Daines, W.G. Start, J.V. O'Brien, S.A. Chambers, W.R. Adams, Jr., N.G. Willetts, T.B. Rice, C.J. Mackey, R.W. Krueger, **A.P. Kausch**, and P.G. Lemaux. (1991). Transformation of Maize Using Microprojectile Bombardment: An Update and Perspective. *In Vitro Cellular & Developmental Biology* 27:21-27.

24. Mackey, C. J., T. M. Spencer, T. R. Adams, **A.P. Kausch**, W. J. Gordon-Kamm, P. G. Lemaux, and R. W. Krueger. 1992. *Transgenic Maize in Transgenic Plants, Vol. 2*. H. C. Kung and K C. Wu Eds. Academic Press, Inc. San Diego, CA.

25. **Kausch, A.P.** and B.D. Bruce. (1994). Isolation and immobilization of various plastid subtypes by magnetic immunoabsorption. *The Plant Journal* 6 (5) 767-779.

Dr. Kausch was a pioneer in biological magnetic separation and nanotechnology. He developed functionalized ferric oxide nanoparticles and demonstrated isolation of DNA, RNA, proteins, organelles, (plastids, mitochondria nuclei and chromosomes in mice). This technology became the basis of large-scale DNA isolation making high throughput DNA sequencing and genomics possible. Paramagnetic beads have been now widely used in biomedical and drug delivery applications. See 1993 [Isolation of biological materials using magnetic particles](#). **Albert P. Kausch**, Sandya Narayanswami, Jerry E. Manning, Barbara Hamkalo; [US Patent Number 5,508,164](#).

26. **Kausch, A.P.**, T. R. Adams, M.L. Mangano, S. Zachwieja, N. G. Willetts, S. A. Chambers, W. Adams, Jr., Amy Anderson, Geoff Williams, G. Haines. (1995). Effects of microprojectile bombardment on embryogenic suspension cell cultures of maize (*Zea mays* L.) used for genetic transformation. *Planta* 196: 501-509.

27. Sonti, Srinivas, Matthew Griffor, Takeshi Sano, Sandya Narayanswami, Arijit Bose, Charles Cantor, and **Albert P. Kausch**. (1995). Large Scale Isolation of plant expression cassette by magnetic triple helix affinity capture. *Nucleic Acids Research* 23:19.

One of the first pioneering papers using magnetic nanoparticle separation of DNA using a triple helix forming sequence.

[Large Scale Isolation of Expression Vector Cassette by Magnetic Triple Helix Affinity Capture](#)

28. **Kausch, A.P.**, T.P. Owen, and B.D. Bruce. (1999). Organelle Isolation by Magnetic Immuno-absorption. *Biotechniques* Vol. 26:336-343.

29. Knapp, J., **Kausch, A.P.**, and J. Chandlee. (2000). Stable Transformation of three genera of Orchids. *Plant Cell Reports* 19: 893-898.

30. Horner, H.T., **A.P. Kausch**, and B.L. Wagner. (2000). Ascorbic acid serves as precursor for oxalate synthesis in calcium oxalate idioblasts of *Yucca torreyi* in liquid root cultures. *International Journal of Plant Sciences* 161 (6):861-868.

31. **Kausch, A.P.**, T. Page Owen, S. Zachwieja, Adam R. Flynn, and J. Sheen (2001). Mesophyll specific, light and metabolic regulation of the C4 PPCZm1 promoter in transgenic maize. *Plant Molecular Biology* 45 (1) 1-16.

The first cloning and analysis of the maize C4 phosphoenolpyruvate carboxylase gene (*PPCZm1*); a key protein in carbon fixation. The developmental, cell-specific, light and metabolic regulation of the homologous C4 *PPCZm1* promoter in stable transgenic maize plants was detailed. This promoter has since been used in many basic applied projects.

[Mesophyll-specific, light and metabolic regulation of the C4 PPCZm1 promoter in transgenic maize](#)

32. Knapp, J., **Kausch, A.P.**, Auer, C., and M. Brand. 2001. Transformation of Rhododendron through Microprojectile Bombardment. *Plant Cell Reports* 20:749-754.

33. Luo, Hong and **Albert P. Kausch** (2002) Application of FLP/*FRT* site-specific DNA recombination system in plants. In: *Genetic Engineering, Principles and Methods, Vol. 24*, Setlow JK (ed.), Kluwer Academic/Plenum Publishers, New York, NY, pp.1-16.

34. Wang, Y. B. Ruemmele, J. Chandlee, M. Sullivan, J. Knapp. and **Albert P. Kausch**. (2002). Embryogenic callus induction and plant regeneration media for bentgrasses and annual bluegrass. *In Vitro Biology* 38:460-467.

35. Wang, Y., M. Browning, B. Ruemmele, J. Chandlee, **Albert P. Kausch**, and Noel Jackson. (2003). Glufosinate reduces fungal diseases in transgenic glufosinate-resistant bentgrasses. *Weed Science* 51:130-137.

36. Basu, C., **Kausch, A.P.**, Luo, H., and J. Chandlee (2003). Promoter analysis in transient assays using a GUS Reporter gene construct in creeping bentgrass (*Agrostis palustris*, L.) *Journal of Plant Physiology* 160:1233-1239.
37. Basu, C., **Kausch, A.P.**, Luo, H., and J. Chandlee (2003). Transient reporter (GUS) expression in creeping bentgrass (*Agrostis palustris*) is affected by in vivo nucleolytic activity. *Biotechnology Letter* 25:939-944.
38. Wang, Y., **Albert P. Kausch**, Hong Luo, Joel M. Chandlee, B.A. Ruummele, M. Browning, N. Jackson, and M. R. Goldsmith (2003). Co-transfer and expression of chitinase, glucanase, and *bar* genes in creeping bentgrass for conferring fungal disease resistance. *Plant Science* 165:497-506.
39. Luo, Hong Qian Hu, Kimberly Nelson, Chip Longo, and **Albert P. Kausch** (2003). Controlling transgene escape in genetically modified grasses. In: *Molecular Breeding of Forage and Turf*, Hopkins A., Wang Z.Y., Mian R., Sledge M., and Barker R. (eds.), Kluwer Academic Publishers.
40. Hong Luo, Qian Hu, Kimberly Nelson, Chip Longo, **Albert P. Kausch**, Joel M. Chandlee, Joseph K. Wipff and Crystal Rose Fricker (2004). *Agrobacterium tumefaciens*-mediated creeping bentgrass (*Agrostis stolonifera* L.) transformation using phosphinothricin selection results in a high frequency of single-copy transgene integration. *Plant Cell Reports* 22:645-652.
41. Hong Luo, Qian Hu, Kimberly Nelson, Chip Longo, and **Albert P. Kausch** (2004). Controlling transgene escape in genetically modified grasses. In: *Molecular Breeding of Forage and Turf*, Hopkins A., Wang Z.Y., Mian R., Sledge M., and Barker R. (eds.), Kluwer Academic Publishers, Dordrecht/Boston/London, pp. 245-254.
42. Melvin J. Oliver, Hong Luo, **Albert P. Kausch**, Harry Collins (2004). Seed-based strategies for transgene containment. In: *Proceedings of 8th International Symposium on the Biosafety of Genetically Modified Organisms*, International Society for Biosafety Research (ISBR), September 26-30, 2004, Montpellier, France, pp. 154-161.
43. Hong Luo, Qian Hu, Kimberly Nelson, Chip Longo, Joel M. Chandlee and **Albert P. Kausch** (2005). *Agrobacterium tumefaciens*-mediated turfgrass transformation. In: *Methods in Molecular Biology – Agrobacterium Protocols (2nd edition)*, Wang K. (ed.) The Humana Press Inc., Totowa, NJ.
44. Hong Luo, **Albert P. Kausch**, Qian Hu, Kimberly Nelson, Joseph K. Wipff, Crystal C. R. Fricker, T. Page Owen, Maria A. Moreno, Jang-Yong Lee and Thomas K. Hodges (2005). Controlling transgene escape in GM creeping bentgrass. In: *Molecular Breeding* 16:185-188.
45. Hong Luo, Jang-Yong Lee, Qian Hu, Kimberly Nelson, **Albert P. Kausch**, Joel M. Chandlee, Tim K. Eitas, Collin Lickwar, Thomas K. Hodges (2006). *RTS*, an anther-specific gene isolated from rice is required for male fertility and its promoter sequence directs tissue-specific transcription in dicotyledonous species. *Plant Molecular Biology* 62:397-408.
46. Chip Longo, Colin Lickwar, Qian Hu, Kimberly Nelson, David Viola, Joel Hague, Joel M. Chandlee, Hong Luo and Albert P. Kausch (2006). Turfgrasses. In: *Methods in Molecular Biology - Agrobacterium Protocols, Vol. 344: Agrobacterium Protocol, 2/e, Vol. 2*, Wang K (ed.) Humana Press Inc., Totowa, NJ, pp. 83-95.
47. Qian Hu, Halina Kononowicz-Hodges, Kimberly Nelson-Vasilchik, David Viola, Peiyu Zeng, Haibo Liu, **Albert P. Kausch**, Joel M. Chandlee, Thomas K. Hodges, Hong Luo (2007). FLP recombinase mediated site-specific recombination in rice. *Plant Biotechnology Journal* 6:2:176-188.

Site Specific recombination technologies in plants, including Cre/lox and FLP/FRT have been versatile genetic tools used for hybrid plant systems development, inducible gene excision and gene confinement strategies. This paper demonstrated site specific recombination in rice mediated by FLP.

[FLP recombinase-mediated site-specific recombination in rice](#)

48. **Albert P. Kausch***, Joel Hague, Melvin Oliver, Yi Li, Henry Daniell, Peter Mascia, and C. Neal Stewart Jr. (2010). Genetic Modification in Dedicated Bioenergy Crops and Strategies for Gene Confinement in P.N. Mascia et al. (eds.), In: *Plant Biotechnology for Sustainable Production of Energy and Co-products, Biotechnology in Agriculture and Forestry 66*, DOI 10.1007/978-3-642-13440-1-10 Springer-Verlag Berlin Heidelberg 2010. [PDF and Full Text](#)
49. **Albert P. Kausch*** Joel Hague, Melvin Oliver, Lidia S. Watrud, Carol Mallory-Smith, Virgil Meier, and C. Neal Stewart Jr. (2010). Gene Flow in Genetically Engineered Perennial Grasses: Lessons for Modification of Dedicated Bioenergy Crops in P.N. Mascia et al. (eds.), In: *Plant Biotechnology for Sustainable Production of Energy and Co-products, Biotechnology in Agriculture and Forestry 66*, DOI [10.1007/978-3-642-13440-1-10](#) Springer-Verlag Berlin Heidelberg 2010.
50. **Kausch, A. P.***, J. Hague, M. Oliver, Y. Li, H. Daniell, P. Mascia, Watrud L. S., and C. Neal Stewart Jr. 2010. Transgenic perennial biofuel feedstocks and strategies for bioconfinement. *Biofuels* 1(1):163-176.
51. Moon, H., J. Abercrombie, **A.P. Kausch**, and C. Stewart. (2010) Sustainable Use of Biotechnology for Bioenergy Feedstocks, In: *Environmental Management*. Springer New York. pp. 1-8.
52. **Albert P. Kausch***, Joel Hague, Adam Deresienski, Michael Tilelli, Chip Longo Jr. and Kimberly Nelson. Male Sterility and Hybrid Plant Systems for Gene Confinement (2012). In: *Plant Gene Confinement* EDS Melvin Oliver and Yi Li. Wiley-Blackwell John Wiley & Sons MA. Chapter 6 pp 85-100.
53. Joel P. Hague, Steven L. Dellaporta, Maria Moreno, Chip Longo, Kimberly Nelson, **Albert P. Kausch*** (2012). Pollen Sterility - A Promising Approach to Gene Confinement and Breeding for Genetically Modified Bioenergy Crops. *Agriculture* 2:295-315.
54. **Kausch, A.P.**, Hague, J., Deresienski A., Tilelli, M., Longo C., and Nelson, K. (2013) Issues in Biotechnology: A Massive Open Online Course (MOOC) Covering in Simple Terms Basic Knowledge About DNA and Biotechnology *INTED Proceedings. Vol. 13* pp 97-102.
55. Howard, T.P., Tordillos, A., Fragoso, C., Moreno, M.A., Mottinger, J.P., **Kausch, A.P.**, Tohme, J., and Dellaporta, S.L. (2013) Identification of the maize gravitropism gene *lazy plant1* by a transposon-tagging genome resequencing strategy.

Perception of gravity by plants has remained mysterious since Darwin was one of the first to document roots show positive gravitropism and stems show negative gravitropism. This paper used positional cloning to identify the *lazy plant1* gene.

[Identification of the Maize Gravitropism Gene *lazy plant1* by a Transposon-Tagging Genome Resequencing Strategy](#)

56. Heffelfinger, C., Deresienski, A., Nelson, K., Moreno, M., Hague, J., Dellaporta, S. and Kausch, A.P.* (2015) Genomic Characterization of Interspecific Hybrids and an Admixture Population Derived from *Panicum amarum x P. virgatum*. *The Plant Genome* Vol. 8. No.2, pp 1-12.

In this paper we developed an innovative technology for recovery of wide cross hybrid. These results demonstrate a widely applicable breeding strategy that makes use of transgenic selectable resistance to

identify the selectable marker in the F1BC1 and recover true non-GMO hybrids source materials. This strategy could be widely applied, especially in vegetable crop and CEA breeding of novel hybrids.

[Genomic Characterization of Interspecific Hybrids and an Admixture Population Derived from *Panicum amarum* × *P. virgatum*](#)

57. **Kausch, Albert***; Tilelli, Michael; Hague, J.; Heffelfinger, Christopher; Cuhna, David; Moreno, Maria; Dellaporta, Stephen; Nelson, Kimberly (2016). In Situ Embryo Rescue for Generation of Wide Intra- and Inter-specific Hybrids of *Panicum virgatum* L. *Plant Biotechnology Journal* doi: 10. 1111/pbi. 12573 pp. 1-8.

58. Hayward, Andrew P; Moreno, Maria A.; Howard, Thomas P.; Hague, Joel; Nelson, Kimberly; Heffelfinger, Christopher; Romero, Sandra; **Kausch, Albert P.**; Glauser, Gaetan; Acosta, Ivan F.; Mottinger, John P; Dellaporta, Stephen L (2016). Control of sexuality by the *sk1*-encoded UDP-glycosyltransferase of maize. *Science Advances* 2: e1600991 pp. 1-9.

Sex determination in maize is the basis for most hybrid plant systems. The *sk1* gene was identified (somewhat painfully), cloned, and found to encode a previously uncharacterized family 1 uridine diphosphate glycosyltransferase that localized to the plant peroxisomes. Constitutive expression of a *sk1* transgene protected all pistils in the plant, causing complete feminization, a gain-of-function phenotype that operates by blocking the accumulation of jasmonates.

[Control of sexuality by the *sk1*-encoded UDP-glycosyltransferase of maize](#)

59. Fredy Altpeter, Nathan M. Springer, Laura E. Bartley, Ann E. Blechl, Thomas P. Brutnell, Vitaly Citovsky, Liza J. Conrad, Stanton B. Gelvin, David P. Jackson, **Albert P. Kausch**, Peggy G. Lemaux, June Medford, Martha L. Orozco-Cárdenas, David M. Tricoli, Joyce Van Eck, Daniel F. Voytas, Virginia Walbot, Kan Wang, Zhanyuan J. Zhang, and C. Neal Stewart Jr. (2016). Transformation in the Era of Genome Editing. In: *The Plant Cell* Volume 28, Issue 7, July 2016, Pages 1510-1520.

This seminal paper was the result of an NSF sponsored Workshop convening a Who's who in plant transformation biology which resulted in a White Paper to Congress which resulted in increased funding to the field of plant transformation.

[Advancing Crop Transformation in the Era of Genome Editing](#)

60. Muruganatham Mookkan, Kimberly Nelson-Vasilchik, Joel Hague, Zhanyuan J. Zhang, and **Albert P. Kausch***. (2017). Selectable marker independent transformation of recalcitrant maize inbred B73 and sorghum P898012 mediated by morphogenic regulators *BABY BOOM* and *WUSCHEL2*. *Plant Cell Reports* DOI 10.1007/s00299-017-2169-1.

In 2016, Keith Lowe, Bill Gordon-Kamm and The Corteva Group published the breakthrough technology using morphogenic regulator genes *Baby Boom* and *Wuschel* to induce somatic embryogenesis. Our paper was the first from an academic lab to reproduce and extend those results by transformation of the recalcitrant inbred B73, which is the also the maize reference genome. These results are now the basis for CRISPR/CAS genome editing in maize and sorghum.

[Selectable marker independent transformation of recalcitrant maize inbred B73 and sorghum P898012 mediated by morphogenic regulators *BABY BOOM* and *WUSCHEL2*](#)

61. Phat Tien Do, Hyeyoung Lee, **Albert P. Kausch** and Zhanyuan J. Zhang. (2018). Rapid and efficient genetic transformation of sorghum via *Agrobacterium*-mediated method. *Current Protocols in Plant Biology*, e20077. <https://doi.org/10.1002/cppb.20077>.

62. Kimberly Nelson-Vasilchik, Joel Hague, Muruganantham Mookkan, Zhanyuan J. Zhang, and **Albert Kausch*** (2018). Transformation of recalcitrant sorghum varieties facilitated by baby boom and wuschel2. *Current Protocols in Plant Biology* 3(4), e200076. <https://doi.org/10.1002/cppb.20076>.

63. **Albert P. Kausch*** Kimberly Nelson-Vasilchik, Joel Hague, Muruganantham Mookkan, Hector Quemada, Stephen Dellaporta, Christopher Fragoso, and Zhanyuan J. Zhang. 2019 Edit at Will: Genotype Independent Plant Transformation in the Era of Advanced Genomics and Genome Editing. *Plant Science*, 281, <https://doi.org/10.1016/j.plantsci.2019.01.006>.

The title expresses the optimism of this Review paper predicting the future of advanced breeding. Genomics, genome editing, and plant transformation biology are therefore an interdependent triad of technologies. Given advances in genomics and genome editing, the need to improve plant transformation technologies was identified as an obvious bottleneck for analysis of functional genomics.

[Edit at will: Genotype independent plant transformation in the era of advanced genomics and genome editing](#)

64. **Albert P. Kausch***, Kan Wang², Heidi F. Kaeppler³, and William Gordon-Kamm (2021). Maize Transformation: History, Progress and Perspectives, *Molecular Breeding* 41, 38, Springer. <https://doi.org/10.1007/s11032-021-01225-0>

It was one of the pleasures of my career to work with these folks on this paper. Our goal of this Review Paper was to create the seminal go to review of this topic from the history to the future. When I first sent the set of illustration, late one night, one of the co-authors wrote, “these are fantastic-what software did you use?” My own. I answered.

[Maize transformation: history, progress, and perspectives](#)

65. **Albert P. Kausch***, Kimberly Nelson, Michael Tilelli and Joel Hague. (2021). **Maize tissue culture, transformation, and genome editing**. *In Vitro Cellular & Developmental Biology – Plant* 2021. **COVER ILLUSTRATION, A Kausch©** *In Vitro Cellular & Developmental Biology – Plant* Springer publications. <https://doi.org/10.1007/s11627-021-10196-y>

This Review covers the intertwined involvement of maize tissue culture and the centrality of somatic embryogenesis to successful transformation and genome editing of maize. These principles are general to the Gramineae and widely applied across the cereal species. Draw your attention to Figure 2. Comparative developmental morphology of embryogenesis in maize, which I think explains everything.

[Maize tissue culture, transformation, and genome editing](#)

That the illustrations for this paper were recognized as the COVER for IN VITRO PLANT Special Issue has been one of the most gratifying recent events in my career. COVER ILLUSTRATION, A. Kausch© *In Vitro Cellular & Developmental Biology – Plant* Springer

[In Vitro Cellular & Developmental Biology – Plant SPECIAL EDITION COVER](#)

66. Hague J., Nelson K., Yonchak A., **Kausch A.P.** (2022) **qPCR Methods for the Quantification of Transgene Insert Copy Number and Zygosity Using the Comparative Ct Method in Transgenic *Sorghum bicolor* L. Moench.** In: Bilichak A., Laurie J.D. (eds) *Accelerated Breeding of Cereal Crops*. Springer Protocols Handbooks. Humana, New York, NY. https://doi.org/10.1007/978-1-0716-1526-3_1.

67. Nelson-Vasilchik, K., Hague, J.P., Tilelli, M. and **Albert P. Kausch.** Rapid transformation and plant regeneration of sorghum (*Sorghum bicolor* L.) mediated by altruistic *Baby boom* and *Wuschel2*. *In Vitro Cellular & Developmental Biology – Plant* Tissue Culture (2022). <https://doi.org/10.1007/s11627-021-10243-8>.

68. **Albert P. Kausch,** Kimberly Nelson-Vasilchik, Michael Tilelli, Christian Roberti, and Joel Hague. (2022). Developmental sequence of somatic embryogenesis initiated by differential expression of *Baby boom* and *Wuschel* in *Sorghum bicolor* L. (In preparation) *In Vitro Cellular & Developmental Biology – Plant* 2022. Plant Springer publ.

E. Textbook

Issues in Biotechnology: The Way We Work With Life

Cognella Press, 2018. Dr. Kausch is the sole owner of all copyrighted materials associated with this publication.

F. Complete Scholarly Work

[Google Scholar Profile](#)

G. Selected Biotechnology and Agricultural Related Patents[‡]

1. 1985. Targeting of foreign proteins to chloroplasts by chimeric gene constructions encoding transit peptides. Plant Genetic Systems (Issued: applicant). European Patent Office. Co-inventors L. Herrera-Estrella, G. Van den Broeck, P. Schreier, H.J. Bohnert, A.R. Cashmore, M. Timko, **A.P. Kausch**, J. Schell. (Plant Genetic Sciences (PGS), Ghent Belgium: assignee).

This patent enabled delivery of transgenic proteins to the chloroplast for targeted traits including RoundUp Ready and Bt Technologies (both chloroplast traits) grown over millions of hectares worldwide. These transgenic crops all utilize a transit peptide to target the protein!

[Chimaeric gene coding for a transit peptide and a heterologous polypeptide](#)

2. 1988. A method for molecular transformation of *Pisum sativum*. **Albert P. Kausch**; Del Monte Corp. (applicant; Abandoned 1993). 1988 USA Patent Office.

3. 1996 Methods and compositions for the production of stably transformed, fertile monocot plants and cells thereof. Thomas R. Adams, Sheryl A. Chambers, Richard J. Daines, William J. Gordon-Kamm, **Albert P.**

Kausch, Peggy G. Lemaux, Catherine J. Mackey, Mary L. Mangano, James V. O'Brien, Thomas B. Rice, T. Michael Spencer, William G. Start, Nancy G. Willetts. Assignee: DEKALB Plant Genetics (Issued: August 27, 1996). [US Patent Number 5,550,318](#).

These were the first fertile GMO corn plants! Kausch made the cell cultures and the Kausch Lab was the tissue and cell culture group. The embryogenic suspension cultures SC82 and SC716 were made in the Kausch Lab.

[Methods and compositions for the production of stably transformed, fertile monocot plants and cells thereof](#)

4. 1996 Isolation of biological materials using magnetic particles. **Albert P. Kausch**, Sandya Narayanswami, Jerry E. Manning, Barbara Hamkalo; Assignee: DEKALB Plant Genetics (Issued: April 16, 1996) applicant. [US Patent Number 5,508,164](#).

Magnet nanoparticle separation of biological materials as a broad patent for a novel technology. This patent formed the basis for commercial magnetic bead (Dyna) high-throughput DNA sequencing (HySeq).

[Isolation of biological materials using magnetic particles](#)

5. 1996 Process of producing fertile transgenic Zea Mays plants and progeny comprising a gene encoding phosphinothricin acetyl transferase. Thomas R. Adams, Sheryl A. Chambers, Richard J. Daines, William J. Gordon-Kamm, **Albert P. Kausch**, Peggy G. Lemaux, Catherine J. Mackey, Mary L. Mangano, James V. O'Brien, Thomas B. Rice, T. Michael Spencer, William G. Start, Nancy G. Willetts. Assignee: DEKALB Plant Genetics (Issued: February 6, 1996). [US Patent Number 5,489,520](#).

This patent protected the first herbicide resistant corn plants. As a broad patent, this concept was further reiterated as a technology across most cereal crops.

[Process of producing fertile transgenic zea mays plants and progeny comprising a gene encoding phosphinothricin acetyl transferase](#)

6. 1997 Isolation of biological materials. **Albert P. Kausch** and Sandya Narayanswami. Assignee: DEKALB Plant Genetics (Issued: September 9, 1997) [US Patent Number 5,665,582](#).

7. 1998 Chimaeric gene coding for a transit peptide and a heterologous peptide. L. Herrera-Estrella, G. Van den Broeck, M. Van Montague, P. Schreier, J. Schell, H.J. Bohnert, A.R. Cashmore, M. Timko, **A.P. Kausch**, Assignees: Plant Genetic Sciences (PGS), Ghent Belgium; and Bayer A.G. Leverkusen. (Issued February 10, 1998). [US Patent Number 5,717,084](#).

8. 1998 Transgenic maize with increased mannitol content. T. R. Adams, P. C. Anderson, R. J. Daines, W. Gordon-Kamm, **A.P. Kausch**, M. T. Mann, P. M. Orr, D. C. Warner. Assignee: DEKALB Genetics Corporation (Issued: July 14, 1998). [US Patent Number 5,780,709](#).

Ultimately, and not intuitive, this process is not very effective for induce drought tolerance in maize, but this patent teaches how to produce large amounts of osmoticum in plants.

[Transgenic maize with increased mannitol content](#)

9. 1998 Chimaeric gene coding for a transit peptide and a heterologous polypeptide. L. Herrera-Estrella, G. Van den Broeck, M. Van Montague, P. Schreier, J. Schell, H.J. Bohnert, A.R. Cashmore, M. Timko, **A.P. Kausch**. Assignees: Plant Genetic Sciences (PGS), Ghent Belgium; and Bayer A.G. Leverkusen. (Issued March 17, 1998) [US Patent Number 5,728,925](#).

This patent capture using the transit peptide to make transgenic plants with inherited chloroplastic traits. (See earlier patented and published work).

[Chimaeric gene coding for a transit peptide and a heterologous polypeptide](#)

10. 1998 USA Patent application *(Improved method for plant transformation) **Albert P. Kausch**, Dennis R. Genovesi, Susan Zachweija, Thomas R. Adams, Sheryl A. Chambers, Mary L. Mangano, T. Michael Spencer. Applicant: DEKALB Plant Genetics.

11. 1999 Methods and compositions for the production of stably transformed, fertile monocot plants and cells thereof. Thomas R. Adams, Sheryl A. Chambers, Richard J. Daines, William J. Gordon-Kamm, **Albert P. Kausch**, Peggy G. Lemaux, Catherine J. Mackey, Mary L. Mangano, James V. O'Brien, Thomas B. Rice, T. Michael Spencer, William G. Start, Nancy G. Willetts. Assignee: DEKALB Plant Genetics (Issued: February 23, 1999). [US Patent Number 5,874,265](#).

12. 1999 Methods and compositions for the production of stably transformed, fertile monocot plants and cells thereof. Thomas R. Adams, Sheryl A. Chambers, Richard J. Daines, William J. Gordon-Kamm, **Albert P. Kausch**, Peggy G. Lemaux, Catherine J. Mackey, Mary L. Mangano, James V. O'Brien, Thomas B. Rice, T. Michael Spencer, William G. Start, Nancy G. Willetts. Assignee: DEKALB Plant Genetics (Issued: July 6, 1999). [US Patent Number 5,919,675](#).

13. 1999 Methods and compositions for the production of stably transformed, fertile monocot plants and cells thereof. Thomas R. Adams, Sheryl A. Chambers, Richard J. Daines, William J. Gordon-Kamm, **Albert P. Kausch**, Peggy G. Lemaux, Catherine J. Mackey, Mary L. Mangano, James V. O'Brien, Thomas B. Rice, T. Michael Spencer, William G. Start, Nancy G. Willetts. Assignee: DEKALB Plant Genetics (Issued: October 19, 1999). [US Patent Number 5,969,213](#).

These last three were follow-on patents on maize transformation and genetic modification.

14. 2000 Chimaeric gene coding for a transit peptide and a heterologous polypeptide. L. Herrera-Estrella, G. Van den Broeck, M. Van Montague, P. Schreier, J. Schell. H.J. Bohnert, A.R. Cashmore, M. Timko, **A.P. Kausch**, Assignees: Plant Genetic Sciences (PGS), Ghent Belgium; and Bayer A.G. Leverkusen. (Issued May 16, 2000) [US Patent Number 6,063,601](#).

This patent covers delivery of a foreign protein to chloroplasts using the transit peptide technology for construction chimeric genes for protein fusions.

[Chimaeric gene coding for a transit peptide and a heterologous peptide](#)

15. 2000 Methods and compositions for transformation of *Rhododendron* spp. by microprojectile bombardment. M. Brand. C. Auer. J. Knapp, and **Albert Kausch**. Assignee: University of Connecticut USA Patent Office (Application, Abandoned 2007).

16. 2000 Chimaeric gene coding for a transit peptide and a heterologous polypeptide. L. Herrera-Estrella, G. Van den Broeck, M. Van Montague, P. Schreier, J. Schell. H.J. Bohnert, A.R. Cashmore, M. Timko, **A.P. Kausch**, Assignees: Plant Genetic Sciences (PGS), Ghent Belgium; and Bayer A.G. Leverkusen. (Issued October 10, 2000) [US Patent Number 6,130,366](#).

17. 2000 A Method for Transformation of Alfalfa. Anthony, J., Vlahova, M., Atanas, and **A.P. Kausch**, Assignee: HybriGene L.L.C. USA Patent Office (Application; Abandoned 2005).

18. 2000 Maize chloroplast aldolase promoter compositions and methods for use thereof. N. Houmard, L. B. Laccetti, E. M. Orozco, and **A.P. Kausch**. Assignee: DEKALB Plant Genetics [US Patent Application 9,757,089](#).

19. 2000 Method for reduction of transgene copy number Brenda Lowe, Michael Spencer and **Albert P. Kausch**. Assignee: DEKALB Plant Genetics. (Issued November 28, 2000) [US Patent Number 6,153,811](#).

This is a transformation biology patent designed to limit the number of inserted transgenes in an event. Control of copy number integration would remain an issue for microprojectile bombardment created transgenic events.

[Method for reduction of transgene copy number](#)

20. 2001 Transgenic monocot plants with increased glycine betaine content. T. R. Adams, P. C. Anderson, R. J. Daines, W. Gordon-Kamm, **A.P. Kausch**, M. T. Mann, P. M. Orr, D. C. Warner. Assignee: DEKALB Plant Genetics US (Issued August 28, 2001) [US Patent Number 6,281,411](#).

21. 2001 Site-specific recombination in turfgrass species. Luo, H. and **A.P. Kausch**. Assignee: HybriGene LLC US Patent Office (PCT Application, Abandoned).

22. 2002 Process of producing male sterile transgenic grasses and cereals, and their progeny. Luo, H. and **A.P. Kausch**. Assignee: HybriGene LLC. US Patent Office (PCT Application).

23. 2002 Methods and compositions for the production of stably transformed, male sterile monocot plants and cells thereof. Luo, H. and **A.P. Kausch**. Assignee: HybriGene LLC. US Patent Office (Application).

24. 2002 Methods and compositions for the production of stably transformed, fertile monocot plants and cells thereof. Anderson, Paul C.; Flick, Christopher E.; Gordon-Kamm, William J.; **Kausch, Albert P.**; Mackey, Catherine J.; Orozco, Emil M.; Orr, Peter; Stephens, Michael A.; Walters, David A.; Walters, Donald S. Assignee: DEKALB Plant Genetics US (Issued) USA Patent Office. Number Assignee: DEKALB Plant Genetics US (Issued June 4, 2002) [US Patent Number 6,399,861](#)

This is a body of intellectual property related to processes optimized for transformation of corn, which was deployed for commercial production of the first genetically engineered corn introduced in the United States.

[Methods and compositions for the production of stably transformed, fertile monocot plants and cells thereof](#)

25. 2003 The use of total vegetative growth for prevention of transgene escape in genetically modified perennials. Luo, Hong., Melvin Oliver, Joel Chandlee and **Albert P. Kausch**. US Patent Office February 7, 2003 (PCT Application).

26. 2003 Methods and compositions for the increase of yield in plants. Spencer, T. Michael; Adams, Thomas R.; Daines, Richard J.; Gordon-Kamm, William J.; **Kausch, Albert P.**; Lemaux, Peggy G.; MacKey, Catherine J.; Mangano, Mary L.; Rice, Thomas B. US Patent Application Number 20030126634.

Several trait genes can be stacked in corn resulting in an increase in yield as determined by production of increased bushels per acre.

27. 2004 Methods and Compositions for the Large-Scale Production of Fresh Green Garlic. **A. Kausch** Provisional Application 2004.

This is a patent on Green Garlic as a new vegetable! I invented a new vegetable! By simple and rigorous varietal selection methods.

[Green Garlic and Methods of Production](#)

28. 2004 Methods and compositions for the production of stably transformed, fertile monocot *plants* and cells thereof. Anderson, Paul C.; Flick, Christopher E.; Gordon-Kamm, William J.; **Kausch, Albert P.**; Mackey, Catherine J.; Orozco, Emil M.; Orr, Peter; Stephens, Michael A.; Walters, David A.; Walters, Donald S. [US Patent Number 6,803,499](#)

29. 2005 Green Garlic and Methods of Production. **A. Kausch** and Peter Sellew. US Patent Office May 5, 2005 ([PCT Application Number 60,568,354](#)).

30. 2006 Methods and Compositions for Increasing Biomass in Genetically Modified Perennials Used for Biofuels. **A.P. Kausch** and M. Oliver. January 23, 2007, Provisional Application.

31. 2006 Maize chloroplast aldolase promoter compositions and methods for use thereof. N. Houmard, L. B. Laccetti, E. M. Orozco, and **A.P. Kausch** Assignee: DEKALB Plant Genetics US Patent Application No, 09/757,089 Assignee: Monsanto Corporation. [US Patent Number 7,151,204](#).

32. 2007 **Kausch, A.P.** and P. Simon. Methods and Compositions for the Large-scale commercial production of green garlic and methods of production. **Albert Kausch** and Phillip Simon, Inventors U.S. PCT No. 60/568,354, filed May 5, 2007.

The unique methods for the large-scale growing conditions of green garlic as a new vegetable for commercial production.

33. 2007 Kausch, A.P. and P. Simon Chemoprotective food products from fresh green garlic active against human food-bourne pathogens. Albert Kausch and Phillip Simon, Inventors U.S. PCT No. 60/568,355, filed May 5, 2007.

34. 2009 Development of controlled total vegetative growth for prevention of transgene escape from genetically modified plants and for enhancing biomass production. Luo, Hong; Chandlee, Joel M.; Kausch, Albert P.; Oliver, Melvin J.; United States Patent Application Number 20100122366.

35. 2009. Male and female sterility lines used to make hybrids in genetically modified plants. Inventors: **Albert Kausch** and Stephen Dellaporta. United States Patent Application. Assignee; University of Rhode Island (pending).

36. 2010. Prevention of transgene escape in genetically modified perennial plants. Luo, Hong; Hu, Qian; Vasilchik, Kimberly Nelson; Longo, JR.; John P.; **Kausch, Albert P.**; Zilinskas, Barbara; Lakkaraju, Subha; Continuation in Part [US Patent Application 20100031387](#). Filed February 4, 2010.

This patent teaches various molecular strategies for gene confinement and hybrid plant systems. Dr. Kausch has eight years research experience with plant gene containment strategies.

[Prevention of transgene escape in genetically modified perennial plants](#)

37. 2010. Methods and compositions for the production of stably transformed, fertile monocot plants and cells thereof. Adams, Thomas R.; Anderson, Paul C.; Chambers, Sheryl A.; Chomet, Paul S.; Daines, Richard J.; Flick, Christopher E.; Glassman, Kimberly; Gordon-Kamm, William J.; Kausch, Albert P.; Laccetti, Lucille B.; Lemaux; Peggy G.; Mackey, Catherine J.; Mangano, Mary Lou; Mann, Michael T.; O'Brien, James V.; Orozco, Emil M.; Orr, Peter; Rice, Thomas B.; Spencer, T. Michael; Start, William G.; Stephens, Michael A.; Vetsch, Clayton S.; Walters, David A.; Walters, Donald S.; Willetts, Nancy G.; Zachwieja, Susan J.; Assignee: DeKalb Genetics Corporation (DeKalb, IL) Appl. No.: 08/113,561. Filed August 25, 1993. [US Patent Number 7,705,215](#)

Improvements to transformation methods for corn with demonstration of the introduction of several commercially significant trait genes.

[Methods and compositions for the production of stably transformed, fertile monocot plants and cells thereof](#)

38. 2011 **Kausch, A.P.**, and P. Sellew. Green Garlic and Methods of Production. [US Patent Number 7,937,889](#), Issued May 10, 2011.

Improved methods for varietal selection for improved green garlic germplasm. There are over 112 new varieties that have yet to be applied for PVP applc.

[Green Garlic and Methods of Production](#)

39. 2012 The use of genetically modified plants for recovery of non-genetically modified hybrids from wide crosses. Inventors: Adam Deresienski, Kimberly Nelson, Michael Tilleli, Joel Hague, Stephen Dellaporta and **Albert Kausch**. United States Patent Application. (pending). Assignee; University of Rhode Island.

40. 2012. In situ embryo rescue and recovery of non-genetically modified hybrids from wide crosses Inventors: Kimberly Nelson, Adam Deresienski, Michael Tilleli, Joel Hague and **Albert Kausch**. United States Patent Application. (pending) Assignee; University of Rhode Island.

41. 2013 Kausch, **A.P.**, and P. Sellew 2013 Green Garlic and Methods of Production. [US Patent Number 8,350,126 B2](#), Issued January 8, 2013.

42. 2016. Dellaporta, S.L; Moreno, M.; Mottinger, J.; and **Kausch, A.P.**; (2016) Transgene and Mutational Control of Sexuality in Maize and Related Grasses Provisional Patent Application No. 62/377,088, filed August 19, 2016.

Maize is a monoecious plant with the male flower, the tassel terminal and the female flower on its axis. The maize flower initiates as a perfect flower, where the female pistillate primordia are aborted in the male and the male staminate parts are aborted in the ear primordia. This patent shows use of the female sexuality in maize for hybrid plants systems generally.

[Transgene and mutational control of sexuality in maize and related grasses](#)

‡ The listed patent applications are in various stages of issuance; Including: Issued US patents, issued European patents, PCT applications, abandoned applications, provisional applications, and those currently are responding to review.

*Because of signed confidentiality agreements, I am not permitted to provide exact titles, disclose filing dates and other designations to some of these documents.

H. Selected Recent Invited and Guest Speaker Titles (23 of 189 - Previous 14 Years Only)

1. **Albert Kausch* Invited Speaker* (2021)** The Centrality of the Development of Transgenic Lines for the Analysis of Photosynthetic and Water Use Efficiencies in Sorghum. **DOE BER Meeting February 2021.**
2. **Albert Kausch* Invited Speaker* (2020)** Development of a Program for a Pipeline to Create Transgenic Lines in Sorghum. DOE BER Meeting February 2020.
3. **Albert Kausch* Invited Speaker* (2020)** The centrality of somatic embryogenesis toward effective transformation in plants. Yale University October 19, 2020.
4. **Albert Kausch* Invited Speaker* (2018)** The Era of New Agricultural Product Development Via Genomics, Plant Transformation, and Genome Editing. Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI 02892. Society for In Vitro biology Meetings, June 2-5, 2018, St. Louis, MO.
5. **Albert Kausch* Invited Speaker* (2017)** Novel methods for rapid transformation and genome editing. Department of Cell and Molecular Biology, University of Rhode Island, 530 Liberty Lane, West Kingston, Rhode Island USA 02892. Massachusetts General Hospital. Harvard University, Cambridge MA, USA, May 19th, 2017.
6. **Albert Kausch* Invited Speaker* (2017)** The Use of Morphogenic Regulators *BABY BOOM* and *WUSCHEL2* to Mediate Transformation of Recalcitrant Maize Inbred B73 and Sorghum P898012. Department of Cell and Molecular Biology, University of Rhode Island, 530 Liberty Lane, West Kingston, Rhode Island USA 02892. Department of Biology, and The Yale Genome Center, Yale University New Haven, CT,
7. **Albert Kausch* Invited Speaker* (2013)** In Situ Embryo Rescue as a Novel Method for Recovery of Non-GMO Hybrids from Wide Crosses. Department of Cell and Molecular Biology, University of Rhode Island, 530 Liberty Lane, West Kingston, Rhode Island USA 02892. Plant Biology 2013, Annual Meetings of the American Society of Plant Biologists (ASPB), July 20-24, Providence, Rhode Island, USA.
8. **Albert Kausch* Invited Speaker* J. Hague, L. Perretta and K. Nelson (2013)** Agricultural Biotechnology: A Massive Open Online Course (MOOC) Module Covering in Simple Terms Basic Knowledge About DNA and Plant Biotechnology. Plant Biology 2013, Annual Meetings of the American Society of Plant Biologists, July 20-24, Providence, Rhode Island, USA.

9. J. Hague, M. Tilelli, D. Cunha, K. Nelson and **A.P. Kausch*** (2013) Invited Speaker* In Situ Embryo Rescue as a Novel Method for Recovery of Non-GMO Hybrids from Wide Crosses. Plant Biology 2013, Annual Meetings of the American Society of Plant Biologists, July 20-24, Providence, Rhode Island, USA.
10. **Kausch, Albert*** (2012) Invited Speaker*. The use of synthetic male and female sterility for recovery of Non-Genetically Modified Hybrids from Wide Crosses. Department of Horticultural Science, North Carolina State University, Mountain Horticultural Crops Research and Extension Center, October 19, 2012.
11. **Kausch, Albert*** (2012) Invited Speaker*. Bioenergy: Genetic Improvement of Bioenergy Crops for Biofuels and Prospects for Artificial Photosynthesis. Department of Chemistry, Brown University, Providence, Rhode Island. September 14, 2012.
12. **Kausch, Albert** (2012) Invited Speaker. Bioenergy: Genetic Improvement of Bioenergy Crops for Biofuels Department of Botany, Connecticut College, New London CT. September 21, 2012.
13. **A.P. Kausch**, Invited Speaker A. Deresienski, J. Hague, M. Tilelli, K. Nelson. (2012) Issues in Biotechnology: An Online General Education Undergraduate Course Covering Simple Terms Basic Knowledge About DNA and Biotechnology. Plant Biology 2012, Annual Meetings of the American Society of Plant Biologists, July 20-24, Austin, TX, USA.
14. J. Hague, A. Deresienski, M. Tilelli, K. Nelson, **A.P. Kausch**. Invited Speaker (2012) The Analysis of Expression Characteristics of the Maize Pollen Specific Promoter MPSP Zm13 and a Strategy for Gene Confinement in Transgenic Bioenergy Crops. Plant Biology 2012, Annual Meetings of the American Society of Plant Biologists, July 20-24, Austin, TX, USA.
15. A. Deresienski, K. Nelson, M. Tilelli, J. Hague, **A.P. Kausch**. (2012) Use of an Herbicide Resistance Selectable Marker for Recovery of Intraspecific and Interspecific Hybrids in Switchgrass. Plant Biology 2012, Annual Meetings of the American Society of Plant Biologists, July 20-24, Austin, TX, USA.
16. K. Nelson, A. Deresienski, M. Tilelli, J. Hague, **A.P. Kausch**. Invited Speaker (2012) A Project-based Undergraduate Internship Program in Agricultural Biotechnology. Plant Biology 2012, Annual Meetings of the American Society of Plant Biologists, July 20-24, Austin, TX, USA.
17. M. Tilelli, K. Nelson, A. Deresienski, J. Hague, **A.P. Kausch**. Invited Speaker (2012) Use of a Selectable Marker for In Situ Embryo Rescue using Transgenic Switchgrass for Recovery of Wide Crosses. Plant Biology 2012, Annual Meetings of the American Society of Plant Biologists, July 20-24, Austin, TX, USA.
18. A. Deresienski, K. Nelson, J. Hague, **A.P. Kausch**. Invited Speaker (2009) Male sterility as a method for constructing wide crosses and for gene confinement in switchgrass and other biofuels grasses. Plant Biology 2009, Annual Meetings of the American Society of Plant Biologists, July 18-22, Hawaii, USA.
19. K. Nelson, J. Hague, A. Deresienski and **A.P. Kausch**. Invited Speaker (2009) Improved methods for tissue culture and genetic transformation of switchgrass. Plant Biology 2009, Annual Meetings of the American Society of Plant Biologists, July 18-22, Hawaii, USA.
20. Transgenic biofuel feedstocks from perennial plants: requirements and strategies for biocontainment. **Albert P. Kausch*** Invited Speaker* (2009) Plant Biotechnology seminar series, University of Massachusetts, Amherst MA Sept 22, 2009.
21. Improved methods for tissue culture and genetic transformation of switchgrass. **A.P. Kausch***, K. Nelson, J. Hague, and A. Deresienski (2009) Invited Speaker* Plant Biotechnology Laboratory,

Department of Cell and Molecular Biology, University of Rhode Island, West Kingston RI 02892.
Amer. Soc. Plant Biology July 22-26, 2009.

22. Strategies for Gene Confinement in Genetically Modified Perennial Plants Used for Biofuels. **A.P. Kausch***, J. Hague, A. Deresienski, K. Nelson, and Melvin Oliver. (2009) Invited Speaker* DOE Annual Meetings Washington, DC Sept 26, 2009. Plant Biotechnology Laboratory, Department of Cell and Molecular Biology, University of Rhode Island, West Kingston RI 02892. Soc. In Vitro Biology June 6-9, 2009.
23. Gene Confinement in Genetically Modified Switchgrass Used for Biofuels. **A.P. Kausch***, J. Hague, A. Deresienski, K. Nelson, and Melvin Oliver. (2008) Invited Speaker* DOE Annual Meetings Washington DC Sept 26, 2009. Plant Biotechnology Laboratory, Department of Cell and Molecular Biology, University of Rhode Island, West Kingston, RI 02892. Society for In Vitro Biology June 6-9, 2008.

I. Published Recent Abstracts and Presentations (21 of 92)

1. Evaluation of overexpression of the maize silkless gene *sk1* in transgenic *Sorghum bicolor*. Liu J.*, Hague J., Nelson-Vasilchik K., and **Kausch A.**** 2019 Society for In Vitro Biology Meetings, Tampa FL June 5-9, 2019.
2. Development of transgenic sorghum lines to evaluate water use and photosynthetic efficiency phenotypes. **Kausch A.***, Nelson-Vasilchik K., Hague J., Liu J., Yi R., Costabile L., Cousins A., Dimario R., Voytas D., Zinselmeier M., Starker C., Liu Y., Leakey A., Prakash P., Rosnow J., and Baxter I.** 2019 Society for In Vitro Biology Meetings, Tampa FL June 5-9, 2019.
3. Selectable marker free Transformation of Maize Inbred B73 and Sorghum P898012 mediated by Morphogenic Regulators *BABY BOOM* and *WUSCHEL2*. Muruganatham Mookkan^{1*}, Kimberly Nelson-Vasilchik^{2*}, Joel Hague^{2*}, Maria Moreno³, Stephen Dellaporta³, Zhanyuan J. Zhang^{1**}, and **Albert Kausch^{2**}** (2017). National Science Foundation awardees meeting, Washington DC. Sept 9, 2017.
4. The Use of Morphogenic Regulators *BABY BOOM* and *WUSCHEL2* to Mediate Transformation of Recalcitrant Maize Inbred B73 and Sorghum P898012. Muruganatham Mookkan^{1*}, Kimberly Nelson-Vasilchik^{2*}, Joel Hague^{2*}, Maria Moreno³, Stephen Dellaporta³, Zhanyuan J. Zhang^{1**}, and **Albert Kausch^{2**}** (2017) Society for In Vitro Biology meetings Raleigh NC June 15, 2017. ¹Plant Transformation Core Facility, University of Missouri, Columbia, MO 6521 ²Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI 02892 and ³Department of Biology, and The Yale Genome Center, Yale University, New Haven, CT.
5. **A.P. Kausch^{1*}**, J. Hague¹, E Oladapo¹, K. Lillard¹, M. Zingarelli², M. Janga¹, T. Jacolucci¹, and K. Nelson¹. A Training Based Internship Model in Plant Transformation for Undergraduates (2016). Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI 02892, 530 Liberty Lane, West Kingston, Rhode Island 02892. The Society for In Vitro Biology (SIVB). June 2016, San Diego, CA.
6. Transforming Cereal Genomics: Tooling Up for Empowered Phenotyping Platforms. **Albert P. Kausch¹**, Zhanyuan J. Zhang², Maria Moreno³, and Stephen L. Dellaporta³ (2016) National Science Foundation awardees meeting, Washington DC. Sept 6, 2016. ¹Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI 02892, ²Plant Transformation Core Facility, University of Missouri Columbia, MO 6521 and ³Department of Biology, and The Yale Genome Center, Yale University New Haven CT.
7. Kimberly Nelson, Joel Hague, Mike Tilelli, David Cunha, Lauren Mellen, Brett Kingsborough, Andrea Johnson, Lianne Perretta, and **Albert P. Kausch^{*}** (2013). Project-based Laboratory Science in Plant

- Biotechnology: An Inquiry-driven Experiential Laboratory Learning Opportunity in Agricultural Biotechnology. Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI USA 02892 and 530 Liberty Lane, West Kingston, Rhode Island USA 02892. Plant Biology 2013, Annual Meetings of the American Society of Plant Biologists (ASPB), July 20-24, Providence, Rhode Island, USA.
8. Joel Hague, Mike Tilelli, David Cunha, Kimberly Nelson and **Albert P. Kausch*** (2013) In Situ Embryo Rescue as a Novel Method for Recovery of Non-GMO Hybrids from Wide Crosses. Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI USA 02892 and 530 Liberty Lane, West Kingston, Rhode Island USA 02892. Plant Biology 2013, Annual Meetings of the American Society of Plant Biologists (ASPB), July 20-24, Providence, Rhode Island, USA.
 9. Kimberly Nelson, Joel Hague, Mike Tilelli, David Cunha, Lauren Mellen, Brett Kingsborough, Andrea Johnson, Lianne Perretta, and **Albert P. Kausch*** (2013) *Lifeedu*: A Delivery Platform for a Massive Open Online Course on Biotechnology Intended for a General Audience. Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI USA 02892 and *Lifeedu* 530 Liberty Lane, West Kingston, Rhode Island USA 02892. The Society for In Vitro Biology (SIVB) June 2013, Providence, Rhode Island.
 10. Adam Dersienski, Kimberly Nelson, Joel Hague, Mike Tilelli, David Cunha, and **Albert P. Kausch***. (2013) Recovery of Intraspecific and Interspecific Hybrids in Switchgrass (*Panicum virgatum* L.) via A Transgenic Herbicide Resistance Selectable Marker. (2013) Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI USA 02892. The Society for In Vitro Biology (SIVB) June 2013, Providence, Rhode Island.
 11. Kimberly Nelson, Joel Hague, Mike Tilelli, David Cunha, Lauren Mellen, Brett Kingsborough, Andrea Johnson, Lianne Perretta, and **Albert P. Kausch***. (2013) Laboratory Internships in Plant Biotechnology: An Inquiry-driven Experiential Learning Opportunity in Agricultural Biotechnology (2013). Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI USA 02892 and *Lifeedu* 530 Liberty Lane, West Kingston, Rhode Island USA 02892. The Society for In Vitro Biology (SIVB) June 2013, Providence, Rhode Island.
 12. Kimberly Nelson, Joel Hague, Mike Tilelli, David Cunha, Adam Dersienski, and **Albert P. Kausch***. (2013) A Novel Method for Recovery of Non-GMO Hybrids from Wide Crosses Using Transgenics as Bridge Intermediates. (2013) Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI USA 02892. The Society for In Vitro Biology (SIVB) June 2013, Providence, Rhode Island.
 13. **Albert P. Kausch***, Joel Hague, Mike Tilelli, David Cunha, Lauren Mellen, Brett Kingsborough, Andrea Johnson¹, Lianne Perretta and Kimberly Nelson. (2013) Pharmaceutical Biotechnology: Bridging the Education Gap in the Post-Genomics Era. (2013). Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI USA 02892 and ² *Lifeedu* 530 Liberty Lane, West Kingston, Rhode Island USA 02892. The Society for In Vitro Biology (SIVB) June 2013, Providence, Rhode Island.
 14. **Albert P. Kausch***, Joel Hague, Mike Tilelli, David Cunha, Lauren Mellen, Brett Kingsborough, Andrea Johnson¹, Lianne Perretta and Kimberly Nelson. (2013) Agriculture, Biotechnology and GMOs: Informing the Debate-A One Credit Educational Online Module (2013). ¹Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI USA 02892; and ² *Lifeedu* 530 Liberty Lane, West Kingston, Rhode Island USA 02892. The Society for In Vitro Biology (SIVB) June 2013, Providence, Rhode Island.
 15. **Albert P. Kausch***, A. Dersienski, J. Hague, M. Tilelli, K. Nelson (2012) Issues in Biotechnology: An Online General Education Undergraduate Course Covering Simple Terms and Basic Knowledge About DNA and Biotechnology. Plant Biotechnology Lab 2012, ¹Department of Cell and Molecular

- Biology, University of Rhode Island, Kingston, RI USA 02892. Annual Meetings of the American Plant Biologists, July 20-24, Austin, TX, USA.
16. J. Hague, A. Deresienski, M. Tilelli, K. Nelson, **Albert P. Kausch*** (2012) The Analysis of Expression Characteristics of the Maize Pollen Specific Promoter MPSP Zm13 and A Strategy for Gene Confinement in Transgenic Bioenergy Crops. ¹Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI USA 02892. Plant Biology 2012, Annual Meetings of the American Society of Plant Biologists, July 20-24, Austin, TX, USA.
 17. Deresienski, K. Nelson, M. Tilelli, J. Hague, **Albert P. Kausch*** (2012) Use of an Herbicide Resistance Selectable Marker for Recovery of Intraspecific and Interspecific Hybrids in Switchgrass. ¹Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI USA 02892. Plant Biology 2012, Annual Meetings of the American Society of Plant Biologists, July 20-24, Austin, TX, USA.
 18. K. Nelson, A. Deresienski, M. Tilelli, J. Hague, **Albert P. Kausch*** (2012) A Project-based Undergraduate Internship Program in Agricultural Biotechnology. ¹Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI USA 02892. Plant Biology 2012, Annual Meetings of the American Society of Plant Biologists, July 20-24, Austin, TX, USA.
 19. M. Tilelli, K. Nelson, A. Deresienski, J. Hague, **Albert P. Kausch*** (2012) Use of a Selectable Marker for In Situ Embryo Rescue using Transgenic Switchgrass for Recovery of Wide Crosses. ¹Department of Cell and Molecular Biology, University of Rhode Island, Kingston, RI USA 02892. Plant Biology 2012, Annual Meetings of the American Society of Plant Biologists, July 20-24, Austin, TX, USA.
 20. Deresienski, K. Nelson, J. Hague, **A.P. Kausch*** (2009), Male sterility as a method for constructing wide crosses and for gene confinement in switchgrass and other biofuels grasses. Plant Biology 2009, Annual Meetings of the American Society of Plant Biologists, July 18-22, Hawaii, USA.
 21. K. Nelson, J. Hague, A. Deresienski and **A.P. Kausch*** (2009), Improved methods for tissue culture and genetic transformation of switchgrass. Plant Biology 2009, Annual Meetings of the American Society of Plant Biologists, July 18-22, Hawaii, USA.

*Corresponding author and/or presenter

J. Educational Materials Development Projects (2013-Present) Lectures, YouTube, Online Courses, DVDs, Workshops, etc.)

1. 2021. *Issues in Biotechnology*. Online. General Education Course Lecture Series and Assessments: A General Education course on Biotechnology for Undergraduates meeting the Natural Sciences Core Requirement University of Rhode Island, 12 Lessons Comprising 28 recorded lectures serving as the foundation for additional biotechnology learning modules. **Albert P. Kausch.**
2. 2021. *Issues in COVID Biology, Biotechnology and Social Impacts* Online. General Education Course Lecture Series and Assessments: A General Education course on Biotechnology for Undergraduates meeting the Natural Sciences Core Requirement University of Rhode Island. **Albert P. Kausch.**
3. 2021. *Masterclasses in Crop Transformation for Genome Editing*. Co-organizers: Christian Rogers, Kan Wang, Dave Somers, Nigel Taylor, Wendy Harwood (**Albert P. Kausch**, presenter).
4. 2021. *Issues in Agriculture and Biotechnology*. **Albert P. Kausch** and David Songstad. A General Education Course structured for all academic levels and backgrounds. Ideal for Corporate Learning Certificates for Professional Enhancement.

5. 2020. *High School Education Materials for Biotechnology Education*. Hosted by six High Schools in Rhode Island **Albert P. Kausch**.
6. 2018. *Education and Research in Agricultural Biotechnology*. Plant Biotechnology Website, University of Rhode Island. **Albert P. Kausch**.
7. 2018. NSF Plant Genome Workshop. *Plant Transformation: Tissue Culture for Plant Transformation Biology* Albert P. Kausch Educational Materials and Workbook. **Albert P. Kausch**.
8. 2016. *Cereal Transformation Working Group (CTWG) Website*. **Albert P. Kausch** Director.
9. 2015. *The Plant Biotechnology Laboratory* at URI Website for CELS **Albert P. Kausch**, Director.
10. 2012. *Issues in Biotechnology: A Massive Open Online Course (MOOC) Covering in Simple Terms Basic Knowledge About DNA and Biotechnology* **Kausch, A.P.**, Hague, J., Deresienski A., Tilelli M., Longo C., and Nelson, K.
11. 2012. *Lifeedu: Pharmaceutical Biotechnology: The Future is Now. A General Massive Open Online Course (MOOC)*. 2013. (Workshop, YouTube Lecture Series, 32 lectures and Course Materials) **Albert P. Kausch**.
12. 2012. *Lifeedu: Agricultural Biotechnology: Informing the Debate: A General Massive Open Online Course (MOOC)*. SIVB 2012. (Workshop; YouTube Lecture Series 72 lectures total and Course Materials) **Albert P. Kausch**.
13. 2011. *Lifeedu: Issues in Biotechnology: Meeting the Current Educational Crisis on Biotechnology. A General Online Course*. 36 lectures. 2011. (YouTube Lecture Series and Course Materials) **Albert P. Kausch**.
14. 2009-2012 *The Way We Work With Life: Issues in Biotechnology*. A lecture series On the Principles, Applications, & Ethics of Biotechnology (containing nineteen lectures contributed by several co-authors) **Albert P. Kausch**, Editor.
15. 2008. *Agricultural Biotechnology Educational Module as a Large Scale Massive Open Online Course (MOOC)* **Albert P. Kausch**.
16. 2007. *Issues in Biotechnology Open-Source Access*. Albert P. Kausch *Lifeedu* Website **Albert P. Kausch**.
17. 2005. *A Workshop on Gene Confinement for Genetically Modified Grasses*. (Editor) May 14, **Albert P. Kausch**.
18. 2005. A General Education Course: *The Way We Work With Life: A Thirty DVD set from the Issues in Biotechnology course series*. 2005. **Albert P. Kausch**.
19. 2004. *Plant Biotechnology for the Developing World*. 2004. **Albert P. Kausch**.
20. 2004. *A Survey Workshop for High School Teachers. All Matters Biotechnology*. (A CD and Workbook package designed and produced with the Science and Non-science Staff of AMGEN.) **Albert P. Kausch**.
21. 2003. *A Workshop for High School Teachers on Agricultural Biotechnology*. **Albert P. Kausch** and Chip Longo. June 2003. Albert P. Kausch.
22. 2003. *The Way We Work With Life: Issues in Biotechnology. A Lecture Series on the Principles, Applications, & Ethics of Biotechnology* (CD containing twenty-three lectures contributed by over fifteen renowned authors. Presented at Connecticut College, Sponsored by Pfizer, In.,) **Albert P. Kausch**, Editor, and organizer.

23. 2003. *A Workshop for Science and Non-Science Staff in the Biopharmaceutical Industries on the Principles and Applications of Biotechnology*. 2003. (A CD and Workbook package designed and produced for the Science and Non-science Staff of AMGEN.) **Albert P. Kausch**.
24. 2003. *A Workshop for High School Teachers on an Educational Kit for Instructional Use on Agricultural Biotechnology* (A CD & Workbook package including materials for learning oriented activities produced in collaboration with Pfizer, Inc.) **Albert P. Kausch** and Chip Longo.
25. 2002. *The Way We Work With Life: Issues in Biotechnology. 2002 A Lecture Series on the Principles, Applications, & Ethics of Biotechnology* (CD containing twenty-three lectures contributed by over fifteen renowned authors, presented at Connecticut College, Sponsored by Pfizer, Inc.) **Albert P. Kausch**, Editor.
26. 2002. *Agricultural Biotechnology: A teaching module for fifth and sixth grade*. **Albert Kausch** and John Longo.
27. 2002. *A Workshop for High School Teachers on the General Principles and Applications of Biotechnology*. 2009 (A CD & Workbook package produced in collaboration with Pfizer, Inc.) **Albert P. Kausch**
28. 2002. *An Educational Workshop for Investment Professionals: The Introduction of Concepts and Applications Regarding DNA, Biotechnology, and the Life Sciences Industries*. 2002. (A DVD and Workbook package produced and delivered to Connecticut Innovations, Inc. and the Connecticut Department of Economic and Community Development [DECD] May 18, 2012) **Albert P. Kausch**.
29. 2001. *Issues in Biotechnology: A General Course on Biotechnology*. Connecticut College (funded by Pfizer Inc.) Course Materials, **Albert P. Kausch**.

K. List of Expert Witness Testimony at Trial or by Deposition

1. 1997. DeKalb Genetics Corporation v. Pioneer Hi-Bred International, Mycogen Corporation, CIBA-Geigy and Northrup King November 5-10, 1997.
2. 1998. DeKalb Genetics Corporation v. Pioneer Hi-Bred International, Mycogen Corporation, CIBA-Geigy and Northrup King January 17, 1998.
3. 1998. DeKalb Genetics Corporation v. Pioneer Hi-Bred International, Mycogen Corporation, CIBA-Geigy and Northrup King February 21, 1998.
4. 1998. DeKalb Genetics Corporation v. Pioneer Hi-Bred International, Mycogen Corporation, CIBA-Geigy and Northrup King May 9, 1998.
5. 1998. DeKalb Genetics Corporation v. Pioneer Hi-Bred International June 18, 1998.
6. 2003. ABT Intellectual Property Trial, Las Vegas, Nevada, July 22, 2003.

L. Other Creative Works

1. *The Continuum*. Poetry by Albert Kausch. 1991. Hozomeen Press, NYC New York.
2. *A Thousand Luna Moths*. Poetry by Albert Kausch. 1992. Hozomeen Press, NYC New York.

3. *The Autarkic*. Poetry by Albert Kausch. 1993. Hozomeen Press, NYC New York.
4. Hozomeen Jam; A Compilation of Spoken Poems with music by David Amram. 2001. NYC New York.
5. *The Abandon*. A novel by Albert Kausch. 2007. (in Proof copy only - unpublished).
6. *The Abandon*. A Play for Voices adapted by Ruth Rosen from the novel by Albert Kausch. 2009. Performed at The Kips Bay Library, NYC February 20, 2009 and The La Grua Center, Stonington, CT June 19, 2009.
7. *The Book of Fighting*. A Children's Book. 2011. Albert Kausch and Nelson Vasilchik. Watch Hill Press, CT.
8. *The Book of Ing*. A Children's Book. 2011. Albert Kausch and Nelson Vasilchik. Watch Hill, Press CT.

Co-Founding Member and contributing author and Editor for **Hozomeen Press**, New York, New York and New London, Connecticut 1990-1997.

Lead for the Band **The MYSTICFIVE**, a funk and jazz band using iconic English-speaking poets as lyric presentations performing live in New York City 2000-2003.

Acting in various roles. King Lear (Wise Fool) 1993. Under Milkwood (Dylan Thomas) 1994. Twelfth Night (Various roles) 1994-1998. The New York City Story-Telling Festival (Iron Hans) 1995. The Eugene O'Neill Theater, New London, CT, 1996. Live Poetry Reading: New York Public Library, NYC, NY 1999. The Abandon (Cameo as the Devil) The La Grua Center, Stonington CT 2009.

M. Statement - Why I Became a Biologist

This I Believe by Albert Kausch

I believe in life. I believe we are a part of nature and not apart from nature. As such we have everything to learn from life; who we are, how we came to be and what is our role here. You see, I am a biologist and biology is the study of life. Some people ask me when I became a biologist. I have been a biologist my whole life, for as long as I can remember, but I think it started when I was five. I caught frogs in kindergarten during recess with my friend Joey Landgraf. That spring, I put frog eggs into a paper cup, brought them home and put them into my goldfish bowl. They hatched into tadpoles and I watched them lose their tails, grow legs and turn into frogs. Later, much later, I studied DNA, genetics and the complexities of gene expression in plants, and I have never lost my wonder or sense of awe or beauty for life. In fact, it has only increased and deepened.

I now ask my students to consider the question; What is life?, in fifty words or less. While it sounds simple, the diversity and complexity of life abounds with contradictions and exceptions which mock naïve definitions. So I have had to come up with my own, which I still consider insufficient, but evolving. It goes like this- "Life is an information processing system capable of replication with variation mediated by metabolism through biochemistry in an aqueous environment and subjected to selection in the stochastic chance and necessity consequential from the big bang resulting in perceptions of beauty, knowledge, truth, love, consciousness, free will, morality, self, and life. As a lifeist, I believe in life and the study of life. Through this lens we can understand the Torah, the Bible, the Quran, the Vedas and the Tao Te Ching. I believe that life would show us the superficial nature of racism, sexism and other xenophobias. There are a lot of sayings and quotes about life and I am sure you know many of them; life is short, life is precious, life is what you make it, but I still like the one by Abraham Lincoln, that 'in the end, it's not the years in your life that count. It's the life in your years.' because life teaches us also about death, as a part of the process of life. I believe that life can also teach us everything we need to know about politics and government, war and peace, economics and money, art and artists, sex and love, family, relationships and the mystery of children. We might also learn about frogs. I wonder where is Joey now.

N. Introduction/Overview

Dr. Albert Kausch is currently a Professor at the University of Rhode Island in the Department of Cell and Molecular Biology, with a research and educational focus on biotechnology. Dr. Kausch completed an MS and PhD in the Molecular, Cellular, and Developmental Biology Program at Iowa State University, and conducted his postdoctoral work on some of the first gene transfer methods to plants. During that time, he conducted seminal research on chloroplast protein targeting in transgenic plants at The Rockefeller University in collaboration with Dr. Marc van Montague's laboratory in Ghent, Belgium, resulting in the use of the transit peptide sequences for protein import to chloroplasts. The transit peptide research resulted in several hallmark patents and became required technology in several important commercial crops. Dr. Kausch worked in the industry sector as a Senior Research Scientist for Pfizer Pharmaceuticals and DeKalb Genetics Corp., and was part of the team that generated the first genetically modified fertile transgenic maize plants and contributed to several other innovative technologies including: (I) the pioneering uses of magnetic nanoparticles and paramagnetic beads for separation of biological materials, including cells, organelles, chromosomes, DNA, RNA, and proteins; (II) drought tolerant maize (II) Biofortification of maize with increased lysine levels and (IV) various molecular technologies, and vectors. Dr. Kausch's major career centrality has been focused on the genetic transformation biology of higher plants with a specialty focus on the cereal species. His research program concentrates on molecular improvement and trait gene discovery and analysis in grasses and cereal crops for basic and applied research purposes. He also conducts research on improved transgenic technologies in cereal crops, and has directed diverse research projects on corn, rice, sorghum, switchgrass, turfgrasses and other crop plants working to introduce traits including herbicide and insect resistance, drought tolerance and yield stability, nutritional improvement, gene regulation, transformation technology development, and others. His current research is on Bioenergy and Renewable energy project in *Sorghum* funded by the DOE. He has authored or co-authored over 65 research publications and is an inventor or co-inventor on over 45 patents in fields of molecular and agricultural biotechnology. He is also Founder and President of The New England Biophilia Institute, The New England Biophilia Institute (biophiliainstitute.com and biophiliaistitute.org) has developed three areas: (1) The production and distribution of materials supporting OMO AR Driven science education at all levels, particularly with a biophilia thematic orientation; (2) Consulting, specializing in all areas of agriculture and innovative online science education; and (3) Maintenance of a close relationship with the nonprofit Biophilia 501(c)(3), formerly known as *Lifeddu*, since 2003. The first two areas constitute the for-profit space of the Institute. He has recently developed a significant program in OMO driven Science Education, Materials, Content, and Curriculum Development. His creative works include three books of poetry, one novel, a play, and two children's books.

O. Current Images and Headshots

