

## CURRICULUM VITAE

Basil John Nikolau  
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**Research Interests:** Research is focused on the functional genomics of metabolism. Integrating biochemical, molecular, genetic and computational strategies to decipher how complex metabolic networks are structured and regulated.

### **Education**

B.Sc., 1st Class Honors                      1977, Massey University, Palmerston North, New Zealand  
Ph.D. (Biochemistry)                        1982, Massey University, Palmerston North, New Zealand

### **Employment Experience**

1978 - 1982            Research Assistant, Department of Chemistry, Biochemistry & Biophysics, Massey University, Palmerston North, New Zealand

1982 - 1983            Postdoctoral Fellow, Department of Biochemistry and Biophysics, University of California, Davis

1983 - 1985            Postdoctoral Fellow, Department of Cellular, Viral and Molecular Biology, University of Utah, Salt Lake City

1985 - 1988            Senior Scientist, Molecular Biology Department of NPI, Salt Lake City

1988 - 1993            Assistant Professor, Department of Biochemistry and Biophysics, Iowa State University

1988 - 1993            Assistant Professor, Department of Food Science and Human Nutrition, Iowa State University

1993 - 1998            Associate Professor, Department of Biochemistry and Biophysics, Iowa State University

1993 - 1998            Associate Professor, Department of Food Science and Human Nutrition, Iowa State University

1998 – present        Professor, Department of Biochemistry, Biophysics and Molecular Biology, Iowa State University

1998 - present        Professor, Department of Food Science and Human Nutrition, Iowa State University

1999 - 2007            Director of Center for Designer Crops, Iowa State University

2007-present         Director of Center for Metabolic Biology, Iowa State University

2001-present         Director of the W.M. Keck Metabolomics Research Laboratory, Iowa State University

2008-present         Deputy Director of the National Science Foundation Engineering Research Center for Biorenewable Chemicals (CBiRC; [www.cbirc.iastate.edu](http://www.cbirc.iastate.edu))

Basil J. Nikolau, Frances M. Craig Professor of Biochemistry  
Center for Metabolic Biology, Director  
W.M. Keck Metabolomics Research Laboratory, Director  
NSF-Engineering Research Center for Biorenewable Chemicals, Deputy Director

- 2012-present Co-Founder and Interim Chief Scientific Officer, *OmegaChea Biorenewables LLC*  
2013-present Co-Founder and Interim Chief Scientific Officer, *VariFAS Biorenewables LLC*

### **Professional Honors**

- 1978 Postgraduate Scholarship, New Zealand University Grants Committee  
1981 Massey University Postgraduate Scholarship  
1988 Award for outstanding paper presentation, American Oil Chemists Society Annual Meeting  
1992 American Chemical Society, Herman Frasch Foundation Research Award  
1996 Iowa State University International Travel Award  
1997 Iowa State University Faculty Improvement Leave  
1998 Iowa State University International Travel Award  
1998 Dean of Agriculture's International Research Grant, Iowa State University  
2001 W.M. Keck Foundation, Research Award (Metabolomics Research Laboratory)  
2002 Iowa State University, Wise and Helen Burroughs Lectureship in Nutrition  
2003 Iowa State University, College of Agriculture, Outstanding Achievement in Research Award  
2004 Iowa State University, College of Agriculture, Team Research Award  
2006 State of Iowa, Regents Faculty Excellence Award  
2008 Frances M. Craig Professorship

### **Recent Scientific Service**

- Served on the Scientific Program Committee for the National Plant Lipid Cooperative biannual meeting, held at Stanford Sierra Conference Center Fallen Leaf Lake, California, June, 2001
- Served on the International Advisory Board for the 2<sup>nd</sup> International Plant Metabolomics Congress, held in Potsdam, Germany, April, 2003
- Served on the Scientific Program Committee for the National Plant Lipid Cooperative biannual meeting, to be held at Stanford Sierra Conference Center Fallen Leaf Lake, California, June, 2003 (<http://www.plantlipids.org/NPLC%202003Home.htm>)
- Organizer of the 3<sup>rd</sup> International Plant Metabolomics Congress, held in Ames, Iowa, USA, June, 2004
- Served on the International Advisory Board for the 4<sup>th</sup> International Plant Metabolomics Congress, to be held in Redding, England, April, 2006
- Served on the organizing committee for the 17th International Symposium on Plant Lipids, to be held in East Lansing, Michigan, July, 2006.
- Served on the advisory committee for the Gordon Research Conference on "Plant Lipids: Structure, Metabolism & Function" held in Galveston, Texas, February, 2009

### **Refereed Publications**

1. **Nikolau, B.J.**, J.C. Hawke and C.R. Slack. 1981. Acetyl-Coenzyme A carboxylase in maize Leaves. *Archives of Biochemistry and Biophysics* **211**:605-612.
2. Sanchez, J. **B.J. Nikolau** and P.K. Stumpf. 1983. Reduction of N-acetyl methionine sulfoxide in plants. *Plant Physiology* **73**:619-623.
3. **Nikolau, B.J.** and J.C. Hawke. 1984. Purification and characterization of maize leaf acetyl-CoA carboxylase. *Archives of Biochemistry and Biophysics* **228**:86-96.

4. **Nikolau, B.J.**, E.S. Wurtele, and P.K. Stumpf. 1984. Tissue distribution of acetyl-coenzyme A carboxylase in leaves. *Plant Physiology* **75**:895-901.
5. **Nikolau, B.J.**, E.S. Wurtele, and P.K. Stumpf. 1984. Subcellular distribution of acetyl-CoA carboxylase in mesophyll cells of barley and sorghum leaves. *Archives of Biochemistry and Biophysics* **235**:555-561.
6. Wurtele, E.S., **B.J. Nikolau**, and E.E. Conn. 1984. The tissue distribution of - cyanoalanine synthase in leaves. *Plant Physiology* **75**:979-982.
7. Berry, J.O., **B.J. Nikolau**, J.P. Carr, and D.F. Klessig. 1985. Transcriptional and post-transcriptional regulation of ribulose-1,5-bisphosphate carboxylase gene expression in light- and dark-grown *Amaranth* cotyledons. *Molecular and Cellular Biology* **5**:2238-2247.
8. **Nikolau, B.J.**, E.S. Wurtele, and P.K. Stumpf. 1985. Use of streptavidin to detect biotin-containing proteins in plants. *Analytical Biochemistry* **149**:448-453.
9. Wurtele, E.S., **B.J. Nikolau**, and E.E. Conn. 1985. Subcellular and developmental distribution of cyanoalanine synthase in barley leaves. *Plant Physiology* **78**:285-290.
10. Berry, J.O., **B.J. Nikolau**, J.P. Carr, and D.F. Klessig. 1986. Translational regulation of light-induced ribulose-1,5-bisphosphate carboxylase gene expression in *Amaranth*. *Molecular and Cellular Biology* **6**:2347-2353.
11. Wurtele, E.S. and **B.J. Nikolau**. 1986. Enzymes of glucose oxidation in leaf tissues: The distribution of the enzymes of glycolysis and the oxidative pentose phosphate pathway between epidermal and mesophyll tissues of C<sub>3</sub>-plants and epidermal, mesophyll and bundle sheath tissues of C<sub>4</sub>-plants. *Plant Physiology* **82**:503-510.
12. Carr, J.P., D.C. Dixon, **B.J. Nikolau**, K.V. Volkerding, and D.F. Klessig. 1987. Synthesis and localization of pathogenesis-related proteins in tobacco. *Molecular and Cellular Biology* **7**:1580-1583.
13. **Nikolau, B.J.** and D.F. Klessig. 1987. Coordinate, tissue-specific and developmental regulation of ribulose-1,5-bisphosphate carboxylase gene expression in *Amaranthus hypochondriacus*. *Plant Physiology* **85**:167-173.
14. Keller, G.L., **B.J. Nikolau**, T.H. Ulrich, and E.S. Wurtele. 1988. Comparison of starch and ADP-glucose pyrophosphorylase levels in non-embryogenic cells and developing embryos from induced carrot cultures. *Plant Physiology* **86**:451-456.
15. Wurtele, E.S., G.L. Keller, **B.J. Nikolau**, and T.H. Ulrich. 1988. Quantitation of starch and ADP-glucose pyrophosphorylase in non-embryogenic cells and embryogenic cell clusters from carrot suspension cultures. *Journal of Plant Physiology* **132**:683-689.

16. Wurtele, E.S. and **B.J. Nikolau**. 1990. Plants contain multiple biotin enzymes: Discovery of 3-methylcrotonyl-CoA carboxylase, propionyl-CoA carboxylase and pyruvate carboxylase in the plant kingdom. *Archives of Biochemistry and Biophysics* **278**:179-186.
17. Ulrich, T.H., E.S. Wurtele, and **B.J. Nikolau**. 1990. Sequence of an mRNA accumulating specifically in carrot somatic embryogenesis. *Nucleic Acid Research* **18**:2826.
18. Wurtele, E.S. and **B.J. Nikolau**. 1992. Differential Accumulation of Biotin Enzymes During Carrot Somatic Embryogenesis. *Plant Physiology* **99**:1699-1703.
19. Wurtele, E.S., H. Wang, S. Durgerian, **B.J. Nikolau** and T.H. Ulrich. 1993. Characterization of a Gene Expressed Early in Somatic Embryogenesis of *Daucus carota*. *Plant Physiology* **102**:303-312.
20. Chen, Y., X. Wang, **B.J. Nikolau** and E.S. Wurtele. 1993. Purification and characterization of 3-methylcrotonyl-CoA carboxylase from carrot. *Archives of Biochemistry and Biophysics* **305**:103-109.
21. Diez, T.A., E.S. Wurtele and **B.J. Nikolau**. 1994. Purification and Characterization of 3-Methylcrotonyl-Coenzyme A Carboxylase from Leaves of *Zea mays*. *Archives of Biochemistry and Biophysics* **310**: 64-75.
22. Wang, X., E.S. Wurtele, G.Keller, A.L. McKean, and **B.J. Nikolau**. 1994. Molecular cloning of cDNAs and genes coding for methylcrotonyl-CoA carboxylase of tomato. *Journal of Biological Chemistry* **269**: 11760-11769.
23. Song, J., E.S. Wurtele and **B.J. Nikolau**. 1994. Molecular Cloning and Characterization of the cDNA Coding for the Biotin-Containing Subunit of 3-Methylcrotonyl-CoA Carboxylase: Identification of the Biotin Carboxylase And Biotin-Carrier Domains. *Proceedings of the National Academy of Sciences U.S.A.* **91**: 5779-5783.
24. Civardi, L., Y. Xia, K.J. Edwards, P.S. Schnable and **B.J. Nikolau**. 1994. The Relationship Between the Genetic and Physical Distances in the Cloned *al-sh2* interval of the *Zea mays* L. genome. *Proceedings of the National Academy of Sciences U.S.A.* **91**: 8268-8272.
25. Schnable, P.S., P.S. Stinard, T-J. Wen, S. Heinen, D. Weber, L. Zhang, J.D. Hansen, and **B.J. Nikolau**. 1994. The genetics of cuticular wax biosynthesis *Maydica*. **39**: 279-287.
26. Weaver, L.M., L. Lebrun, E.S. Wurtele and **B.J. Nikolau**. 1995. 3-Methylcrotonyl-CoA carboxylase of *Arabidopsis thaliana*: Isolation and characterization of cDNA coding for the biotinylated subunit. *Plant Physiology* **107**: 1013-1014.
27. Wang, X., Wurtele, E.S. and **Nikolau, B.J.** 1995. Regulation of methylcrotonyl-CoA carboxylase activity by biotinylation of the apoenzyme. *Plant Physiology*. **108**: 1133-1139.

28. Yanai Y, T. Kawasaki, H. Shimada, E.S. Wurtele, **B.J. Nikolau** and N. Ichikawa. 1995. Genetic organization of the 251 kDa acetyl-CoA carboxylase genes in *Arabidopsis*: Tandem gene duplication has made two differentially expressed isozymes. *Plant and Cell Physiology* **36**: 779-787.
29. Choi, J-K., Y. Fei, E.S. Wurtele and **B.J. Nikolau**. 1995. Molecular cloning and characterization of the cDNA coding for the biotin-containing subunit of the chloroplastic acetyl-CoA carboxylase. *Plant Physiology* **109**: 619-625.
30. Chen, L., Y. Moon, J. Shanklin, **B.J. Nikolau** and A.G. Atherly. 1995. Cloning and sequence of a cDNA encoding stearyl-acyl carrier protein desaturase from *Glycine max*. *Plant Physiology* **109**: PGR95-105.
31. Xu, X., A-P. Hsia, L. Zhang, **B.J. Nikolau** and P.S. Schnable. 1995. Meiotic recombination breakpoints resolve at high rates at the 5' end of a maize coding sequence. *Plant Cell* **7**: 2151-2161.
32. Weaver L.M., F. Yu, E.S. Wurtele and **B.J. Nikolau** 1996. Characterization of the cDNA and gene coding for the biotin synthase of *Arabidopsis thaliana*. *Plant Physiology* **110**: 1021-1028.
33. Xia Y.J., **B.J. Nikolau**, P.S. Schnable (1996) Cloning and characterization of *CER2*, an *Arabidopsis* gene that affects cuticular wax accumulation. *Plant Cell* **8**: 1291-1304.
34. Ke J, J-K. Choi, M. Smith, H.T. Horner, **B.J. Nikolau**, E.S. Wurtele. 1997. Structure of the *CAC1* gene and *in situ* characterization of its expression: The *Arabidopsis thaliana* gene coding for the biotin-containing subunit of the plastidic acetyl-CoA carboxylase. *Plant Physiology* **113**: 1091-1100.
35. Hansen, J.D., J. Pyee, Y. Xia, T-J. Wen, D.S. Robertson, P.E. Kolattukudy, **B.J. Nikolau**, P.S. Schnable. 1997. The *glossyl* locus of *Zea mays* L. and an epidermis-specific cDNA from *Kleinhovia odorata* define a class of receptor-like proteins required for the normal accumulation of cuticular waxes. *Plant Physiology* **113**: 1091-1100.
36. Liu, L., E.G. Hammond, **B.J. Nikolau**. 1997. *In vivo* studies of the biosynthesis of a-eleostearic acid in the seeds of *Momordica charantia* L. *Plant Physiology* **113**: 1343-1349.
37. Xu, X.J., Y.J. Xia, C. Dietrich, **B.J. Nikolau**, Schnable P.S. 1997. Sequence analysis of the cloned *glossy8* gene of maize suggests that it may code for a ketoacyl reductase required for the biosynthesis of cuticular waxes. *Plant Physiology* **115**: 501-510.
38. Xia Y, **BJ Nikolau**, and PS Schnable 1997. Developmental and hormonal regulation of the *Arabidopsis CER2* gene which codes for a nuclear localized protein required for the normal accumulation of cuticular waxes. *Plant Physiology* **115**: 925-937.
39. Sun, J., J. Ke, J.L. Johnson, **B.J. Nikolau**, E.S. Wurtele. 1997. Biochemical and molecular biological characterization of *CAC2*: The *Arabidopsis thaliana* gene coding for the biotin

- carboxylase subunit of the plastidic acetyl-CoA carboxylase. *Plant Physiology* **115**: 1371-1383.
40. Caffrey, J.J., J-K. Choi, E.S. Wurtele, **B.J. Nikolau**. 1998. Tissue distribution of acetyl-CoA carboxylases in leaves of leek (*Allium porrum* L.). *Journal of Plant Physiology* **153**: 265-269.
  41. Liu, L., E.G. Hammond and **B.J. Nikolau**. 1998. *In vivo* studies of the biosynthesis of vernolic acid in the seeds of *Vernonia galamensis*. *Lipids* **33**: 1217-1221.
  42. Anderson MD, Che P, Song J, **Nikolau BJ**, Wurtele ES. 1998. 3-Methylcrotonyl-CoA carboxylase is a component of the mitochondrial leucine catabolic pathway in plants. *Plant Physiology* **118**: 1127-1138.
  43. Guan X, Diez T, Prasad KT, **Nikolau BJ**, Wurtele ES. 1999. Geranoyl-CoA carboxylase: A novel biotin-containing enzyme in plants. *Archives of Biochemistry and Biophysics* **362**: 12-21.
  44. McKean, A.M., P. Che, S. Achenbach, E.S. Wurtele and **B.J. Nikolau**. 2000. Molecular cloning and characterization of the cDNA and gene coding for the nonbiotinylated subunit of 3-methylcrotonyl-CoA carboxylase. *Journal of Biological Chemistry* **275**: 5582-5590.
  45. Ke, J., T-N. Wen, E.S. Wurtele and **B.J. Nikolau**. 2000. Coordinate regulation of the spatial and temporal expression of the nuclear and chloroplastic encoded genes of the heteromeric acetyl-CoA carboxylase. *Plant Physiology* **122**: 1057-1071.
  46. Ke, J-S., B. Behal, S. Yunkers, **B.J. Nikolau**, E.S. Wurtele and D.J. Oliver. 2000. The role of pyruvate dehydrogenase and acetyl-CoA synthetase in fatty acid synthesis in developing *Arabidopsis* seeds. *Plant Physiology* **123**: 497-508.
  47. Dietrich, C., F. Cui, M. Packila, D. Ashlock, **B.J. Nikolau**, P.S. Schnable . 2002. Maize *Mu* transposons are targeted to the 5' UTR of the *gl8a* gene and sequences flanking *Mu* target site duplications throughout the genome exhibit non-random nucleotide composition. *Genetics* **160**: 697-716.
  48. Xu X, CR Dietrich, R Lessire, **BJ Nikolau**, PS Schnable. 2002. The endoplasmic reticulum-associated maize GL8 protein is one of the components of the acyl-CoA elongase complex involved in the production of cuticular waxes. *Plant Physiology* **128**: 924-934.
  49. Yao H, Q Zhou, J Li, H Smith, M Yandean, **BJ Nikolau**, PS Schnable. 2002. Molecular characterization of meiotic recombination across the 140-kb multigenic *a1-sh2* interval of maize. *Proceedings National Academy Science U.S.A.* **99**: 6157-6162.
  50. Che, P., E.S. Wurtele and **B.J. Nikolau**. 2002. Developmental and environmental regulation of 3-methylcrotonyl-CoA carboxylase expression in *Arabidopsis*. *Plant Physiology* **129**: 616-624

51. Fatland, B.L., J. Ke, M. Anderson, W. Mentzen, L-W. Cui, C. Allred, J. L. Johnston, **B.J Nikolau**, E.S. Wurtele. 2002. Molecular characterization of a novel heteromeric ATP-citrate lyase that generates cytosolic pool of acetyl-CoA in Arabidopsis. *Plant Physiology* 130: 740-756.
52. Che, P., Weaver, L.M., E.S. Wurtele and **B.J. Nikolau**. 2003. The role of biotin in regulating 3-methylcrotonyl-CoA carboxylase expression in Arabidopsis. *Plant Physiology* 131: 1479-1486.
53. Fatland, B.L., **B.J Nikolau**, E.S. Wurtele. 2005. Reverse Genetic Characterization of Cytosolic Acetyl-CoA Generation by ATP-citrate lyase in Arabidopsis. *Plant Cell*. 17: 182-203.
54. Yandeau-Nelson M.D., Zhou, Q., Yao, H., Xu, X., Nikolau, B.J, Schnable, P.S. 2005. MuDR transposase increases the frequency of meiotic crossovers in the vicinity of a *Mu* insertion in the maize *al* gene. *Genetics* 169: 917-929.
55. Sluszny, C., Yeung, E.S., **Nikolau, B.J.** 2005 *In situ* probing of the biotic-abiotic boundary of plants by laser desorption/ionization time-of-flight mass spectrometry. *Journal of the American Society of Mass Spectrometry*. 16: 107-115
56. Dietrich, C.R., M.A.D.N. Perera, M. Yandeau, R.B. Meeley, **B.J. Nikolau**, and P.S. Schnable. 2005. Characterization of two *gl8* paralogs reveals that the 3-ketoacyl reductase component of fatty acid elongase is essential for maize (*Zea mays* L.) development. *Plant Journal*. 42: 844-861.
57. Yandeau-Nelson M.D., **B.J. Nikolau** and P.S. Schnable. 2006. Effects of trans-acting Genetic Modifiers on Meiotic Recombination Across the *a1-sh2* Interval of Maize. *Genetics* 174: 101-12
58. **Nikolau BJ**, Perera MA, Brachova L, Shanks B. 2008. Platform biochemicals for a biorenewable chemical industry. *Plant Journal*. 54: 536-545
59. Muralla R, Chen E, Sweeney C, Gray JA, Dickerman A, **Nikolau, B.J.**, Meinke, D. 2008. A bifunctional locus (BIO3-BIO1) required for biotin biosynthesis in Arabidopsis. *Plant Physiology*. 146: 60-73
60. Mentzen WI, Peng J, Ransom N, **Nikolau BJ**, Wurtele ES. 2008. Articulation of three core metabolic processes in Arabidopsis: fatty acid biosynthesis, leucine catabolism and starch metabolism. *BMC Plant Biology*. 8: 76
61. Fiehn O, Wohlgemuth G, Scholz M, Kind T, Lee do Y, Lu, Y., Moon, S., **Nikolau, B.J.** 2008. Quality control for plant metabolomics: reporting MSI-compliant studies. *Plant Journal*. 53: 691-704
62. Cha S, Zhang H, Ilarslan HI, Wurtele ES, Brachova L, **Nikolau, B.J**, Yeung, ES. 2008.

- Direct profiling and imaging of plant metabolites in intact tissues by using colloidal graphite-assisted laser desorption ionization mass spectrometry. *Plant Journal*. 55: 348-360
63. Aguilar JA, Diaz-Perez C, Diaz-Perez AL, Rodriguez-Zavala JS, **Nikolau BJ**, Campos-Garcia J. 2008. Substrate specificity of the 3-methylcrotonyl coenzyme A (CoA) and geranyl-CoA carboxylases from *Pseudomonas aeruginosa*. *Journal Bacteriology*. 190: 4888-4893
  64. Wu L, Dixon PM, **Nikolau BJ**, Kraus GA, Widrlechner MP, Wurtele ES. 2009. Metabolic Profiling of Echinacea Genotypes and a Test of Alternative Taxonomic Treatments. *Planta Medica*, 75: 178-183
  65. Perera MA, Choi SY, Wurtele ES and **Nikolau BJ**. 2009. Quantitative analysis of short-chain acyl-coenzymeAs in plant tissues by LC-MS-MS electrospray ionization method. *J Chromatography B Analytical Technology Biomedical Life Science*. 877: 482-488
  66. Maury W, Price JP, Brindley MA, Oh C, Neighbors JD, Wiemer DF, Wills N, Carpenter S, Hauck C, Murphy P, Widrlechner MP, Delate K, Kumar G, Kraus GA, Rizshsky L and **Nikolau BJ**. 2009. Identification of light-independent inhibition of human immunodeficiency virus-1 infection through bioguided fractionation of *Hypericum perforatum*. *Virology Journal*. 6, 101
  67. LaLone CA, Rizshsky L, Hammer KD, Wu L, Solco AK, Yum M, **Nikolau BJ**, Wurtele ES, Murphy PA, Kim M and Birt DF. 2009. Endogenous levels of *Echinacea* alkylamides and ketones are important contributors to the inhibition of prostaglandin E2 and nitric oxide production in cultured macrophages. *Journal of Agricultural Food Chemistry*. 57: 8820-8830
  68. Brindley MA, Widrlechner MP, McCoy JA, Murphy P, Hauck C, Rizshsky L, Nikolau BJ and Maury W. 2009. Inhibition of lentivirus replication by aqueous extracts of *Prunella vulgaris*. *Virology Journal* 6: 8.
  69. Cha S, Song Z, **Nikolau BJ** and Yeung ES. 2009. Direct profiling and imaging of epicuticular waxes on *Arabidopsis thaliana* by laser desorption/ionization mass spectrometry using silver colloid as a matrix. *Analytical Chemistry*. 81: 2991-3000
  70. Oliver DJ, **Nikolau BJ**, Wurtele ES. 2009. Acetyl-CoA—Life at the metabolic nexus. *Plant Science* 176: 597-601.
  71. Huang N, Hauck C, Yum MY, Rizshsky L, Widrlechner MP, McCoy JA, Murphy PA, Dixon PM, **Nikolau BJ**, Birt DF. 2009. Rosmarinic acid in *Prunella vulgaris* ethanol extract inhibits lipopolysaccharide-induced prostaglandin E2 and nitric oxide in RAW 264.7 mouse macrophages. *Journal of Agricultural Food Chemistry*. 57:10579-89.
  72. Jun JH, Song Z, Liu Z, **Nikolau BJ**, Yeung ES, Lee YJ. 2010. High-spatial and high-mass resolution imaging of surface metabolites of *Arabidopsis thaliana* by laser desorption-ionization mass spectrometry using colloidal silver. *Analytical Chemistry*. 82:3255-3265.



73. Lalone CA, Huang N, Rizshsky L, Yum MY, Singh N, Hauck C, **Nikolau BJ**, Wurtele ES, Kohut ML, Murphy PA, Birt DF. 2010. Enrichment of *Echinacea angustifolia* with Bauer alkylamide 11 and Bauer ketone 23 increased anti-inflammatory potential through interference with cox-2 enzyme activity. *Journal of Agriculture and Food Chemistry*. 58: 8573-8584.
74. Bais P, Moon SM, He K, Leitao R, Dreher K, Walk T, Scaet Y, Barkan L, Wohlgemuth G, Roth MR, Wurtele ES, Dixon P, Fiehn O, Lange BM, Shulaev V, Sumner LW, Welti R, **Nikolau BJ**, Rhee SY, Dickerson JA. 2010. PlantMetabolomics.org: a web portal for plant metabolomics experiments. *Plant Physiology*. 152:1807-1816.
75. Jiang Y, **Nikolau BJ**, Ma Y. (2010) Separation and quantification of short-chain coenzyme A in plant tissues by capillary electrophoresis with laser-induced fluorescence detection, *Analytical Methods*. 2:1900-1904.
76. Wu L, Rowe EW, Jeftinija K, Jeftinija S, Rizshsky L, **Nikolau BJ**, McKay J, Kohut M, Wurtele ES. 2010. Echinacea-induced cytosolic Ca<sup>2+</sup> elevation in HEK293. *BMC Complement Alternative Medicine*. 10:72.
77. Perera MADN, Qin W, Yandau-Nelson M, Fan L, Dixon P, **Nikolau BJ**. 2010. Biological origins of normal-chain hydrocarbons. *The Plant Journal*. 64: 618-632
78. Xu L, Ilarslan H, Qian H-R, Li L, Che P, Wurtele ES, **Nikolau BJ**. 2011. Reverse genetic analysis of the two biotin-containing subunit genes of the heteromeric acetyl-CoA carboxylase indicates a unidirectional functional redundancy. *Plant Physiology*. 155: 293-314
79. Chen Y, Apolinario E, Brachova L, Kelman Z, Li Z, **Nikolau BJ**, Showman L, Sowers K, Orban J. (2011) An nuclear magnetic resonance based approach to accurate functional annotation of putative enzymes in the methanogen *Methanosarcina acetivorans*. *BMC Genomics*. 12 Suppl 1:S7.
80. Huang N, Rizshsky L, Hauck C, **Nikolau BJ**, Murphy PA, Birt DF. (2011) Identification of anti-inflammatory constituents in *Hypericum perforatum* and *Hypericum gentianoides* extracts using RAW 264.7 mouse macrophages. *Phytochemistry*. 72: 2015-2023.
81. Jing F, Cantu DC, Tvaruzkova J, Chipman JP, **Nikolau BJ**, Yandau-Nelson MD, Reilly PJ. 2011. Phylogenetic and experimental characterization of an acyl-ACP thioesterase family reveals significant diversity in enzymatic specificity and activity. *BMC Biochemistry*. 12:44.
82. Schmidt MA, Barbazuk WB, Sandford M, May G, Song Z, Zhou W, **Nikolau BJ**, Herman EM. 2011. Silencing of soybean seed storage proteins results in a rebalanced protein composition preserving seed protein content without major collateral changes in the metabolome and transcriptome. *Plant Physiology*. 156: 330-345

83. Zhang X, Rizshsky L, Hauck C, Qu L, Widrlechner MP, **Nikolau BJ**, Murphy PA, Birt DF. 2012. Bauer ketones 23 and 24 from *Echinacea paradoxa* var. *paradoxa* inhibit lipopolysaccharide-induced nitric oxide, prostaglandin E2 and cytokines in RAW264.7 mouse macrophages. *Phytochemistry*. 74:146-158.
84. Bais P, Moon-Quanbeck SM, **Nikolau BJ**, Dickerson JA. 2012. Plantmetabolomics.org: mass spectrometry-based Arabidopsis metabolomics--database and tools update. *Nucleic Acids Research*. doi:10.1093/nar/gkr969
85. Lee YL, Perdian DC, Song Z, Yeung ES, **Nikolau BJ**. 2012. Use of mass-spectrometry for imaging metabolites in plants. *The Plant Journal*. 70:81-95.
86. Huang N, Rizshsky L, Hauck CC, Nikolau BJ, Murphy PA, Birt DF. 2012. The inhibition of lipopolysaccharide-induced macrophage inflammation by 4 compounds in *Hypericum perforatum* extract is partially dependent on the activation of SOCS3. *Phytochemistry*. 76:106-116.
87. Ding G, Che P, Ilarslan H, Wurtele ES, **Nikolau BJ**. 2012. Genetic dissection of methylcrotonyl-CoA carboxylase indicates a complex role for mitochondrial leucine catabolism during seed development and germination. *The Plant Journal*. 70:562-577.
88. Jin H, Song Z, **Nikolau BJ**. 2012. Reverse Genetic Characterization of two Paralogous Acetoacetyl-CoA Thiolase genes in Arabidopsis Reveals Their Importance in Plant Growth and Development. *The Plant Journal*. 70:1015-1032.
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94. Wurtele ES, Chappell J, Jones AD, Celiz MD, Ransom N, Hur M, Rizshsky L, Crispin M, Dixon P, Liu J, P.Widrechner M, **Nikolau BJ**. Medicinal Plants: A Public Resource for Metabolomics and Hypothesis Development. *Metabolites*. 2012; 2(4):1031-1059.
95. Hur M, Campbell AA, Almeida-de-Macedo M, Li L, Ransom N, Jose A, Crispin M, **Nikolau BJ**, Wurtele ES. 2013. A global approach to analysis and interpretation of metabolic data for plant natural product discovery. *Natural Product Reports*, **30**, 565-583. DOI: 10.1039/c3np20111b
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97. Jin H, Nikolau BJ. 2014. Evaluating PHA productivity of bioengineered *Rhodospirillum rubrum*. *PLOS One*. **9**:e96621; doi: 10.1371/journal.pone.0096621.
98. Fukushima A, Kusano M, Mejia RF, Iwasa M, Kobayashi M, Hayashi N, Watanabe-Takahashi A, Narisawa T, Tohge T, Hur M, Wurtele ES, **Nikolau BJ**, Saito K. 2014. Metabolomic Characterization of Knockout Mutants in Arabidopsis: Development of a Metabolite Profiling Database for Knockout Mutants in Arabidopsis. *Plant Physiology* **165**: 948-961
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100. Sumner LW, Lei Z, **Nikolau BJ**, Saito K. 201. Modern plant metabolomics: advanced natural product gene discoveries, improved technologies, and future prospects. *Natural Product Reports*. Advance Article, published online 24 Oct 2014; DOI:10.1039/C4NP00072B
101. Korte AR, Yandea-Nelson MD, **Nikolau BJ**, Lee YJ. 2015. Subcellular-level resolution MALDI-MS imaging of maize leaf metabolites by MALDI-linear ion trap-Orbitrap mass spectrometer. *Anal Bioanal Chem*, [epub ahead of print](#). doi: 10.1007/s00216-015-8460-5. PMID: 25618761.
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103. Li L, Hur M, Lee JY, Zhou W, Song Z, Ransom N, Demirkale CY, Nettleton D, Westgate M, Arendsee Z, Iyer V, Shanks J, **Nikolau B**, Wurtele ES. 2015. A systems biology approach toward understanding seed composition in soybean. [BMC Genomics, Suppl 3:S9](#). doi: 10.1186/1471-2164-16-S3-S9. PMID:25708381.
104. Noutsos C, Perera AM, **Nikolau BJ**, Seaver SM, Ware DH. 2015. Metabolomic profiling of the nectars of *Aquilegia pubescens* and *A. canadensis*. [PLoS One, 10:e0124501](#). doi:10.1371/journal.pone.0124501. PMID: 25933103.
105. Guan X, Chen H, Abramson A, Man H, Wu J, Yu O, **Nikolau BJ**. 2015. A phosphopantetheinyl transferase that is essential for mitochondrial fatty acid biosynthesis. [Plant J. Sep 24. doi. 10.1111/tpj.13034](#).
106. Guan X, **Nikolau BJ**. 2016. AAE13 encodes a dual-localized malonyl-CoA synthetase that is crucial for mitochondrial fatty acid biosynthesis. [Plant J. Feb 2. doi 10.1111/tpj.13130](#). Featured on cover of the March, 2016 issue of journal.
107. Jin H, Jin, Y, Song Z, Lahiri D, **Nikolau, BJ**. 2014. Genetic dissection of the physiological function of 3-ketoacyl-ACP synthase III gene redundancy in determining fatty acid production in *Bacillus subtilis*. *In revision*.
108. Jing F, Yandeau-Nelson M, Nikolau BJ. 2014. Identification of active site residues implies a two-step catalytic mechanism for acyl-ACP thioesterase. *In revision*.
109. Garg S, Yandeau-Nelson M, Nikolau BJ. 2014. Understanding the structural basis of diverse functionalities of *E. coli* and *B. subtilis* KASIII enzymes using STD NMR based KASIII-ligand interaction studies. *In preparation*.
110. Jing F, Yandeau-Nelson M, Nikolau BJ. 2014. Dissecting the structural determinants of chain length selectivity of plant acyl-ACP thioesterases. *In preparation*.

### **Invited Publications**

1. Schnable, P.S., R. Wise, **B.J. Nikolau**. 1992. Transposon tagging agronomically important loci in maize. Proceedings, 28th Annual Illinois Corn Breeder's School, pp. 24-45.
2. **Nikolau, B.J.**, E.S. Wurtele, J. Caffrey, Y. Chen, V. Crane, T. Diez, J-Y. Huang, M.T. McDowell, X-M. Shang, J. Song, X. Wang and L.M. Weaver. 1993. The biochemistry and molecular biology of acetyl-CoA carboxylase and other biotin enzymes. *In Biochemistry and Molecular-Biology of Membrane and Storage Lipids of Plants*. (N. Murata and C. Somerville, eds.) American Society of Plant Physiologists Press, pp. 138-149.
3. Schnable, P.S., **B.J. Nikolau**, P.S. Stinard, Y. Xia, J.D. Hansen, X. Xu, M. Delledonne and M.E. Myszewski. 1993. Genetic approaches to isolating maize and *Arabidopsis* genes involved in cuticular wax biosynthesis. *In Biochemistry and Molecular-Biology of*

- Membrane and Storage Lipids of Plants. (N. Murata and C. Somerville, eds.) American Society of Plant Physiologists Press, pp. 196-206.
4. Schnable P.S., X.J. Xu, L. Civardi, Y.J. Xia, A.P. Hsia, L. Zhang, **B.J. Nikolau**. 1996. The role of meiotic recombination in generating novel genetic variability. *In The Impact of Plant Molecular Genetics* (B.W.S. Sobral, ed). Birkhäuser Press, Boston, pp 103-110.
  5. Schnable P.S., A-P. Hsia, **B.J. Nikolau**. 1998. Genetic Recombination in Plants. *Current Opinions in Plant Biology*. 1: 123-129.
  6. Wurtele, E.S., **B.J. Nikolau**. 2000. Characterization of 3-methylcrotonyl-CoA carboxylase from plants. *Methods in Enzymology*. v324, 280-292.
  7. D.J., Oliver, **B.J. Nikolau**, E.S. Wurtele. 2002. Functional Genomics: High throughput mRNA, protein, and metabolite analyses. *Metabolic Engineering*. 4: 98-106
  8. **Nikolau, B.J.**, Ohlrogge, J.B., Wurtele, E.S. 2003. Plant Biotin-Containing Carboxylases. Archives of Biochemistry and Biophysics. Minireview. *Archives of Biochemistry and Biophysics*. 414:211-222.
  9. Bino, R.J., Hall, R.D., Fiehn, O., Kopka, J., Saito, K., Draper, J., **Nikolau, B.J.**, Mendes, P., Roessner-Tunali, U., Beale, M.H., Trethewey, R.N., Lange, B.M., Wurtele, E.S., Sumner, L.W. 2004. Potential of metabolomics as a functional genomics tool. *Trends in Plant Sciences*. 9:418-425.
  10. Jenkins H, Hardy N, Beckmann M, Draper J, Smith AR, Taylor J, Fiehn O, Goodacre R, Bino RJ, Hall R, Kopka J, Lane GA, Lange BM, Liu JR, Mendes P, **Nikolau BJ**, Oliver SG, Paton NW, Rhee S, Roessner-Tunali U, Saito K, Smedsgaard J, Sumner LW, Wang T, Walsh S, Wurtele ES, Kell DB. 2004. A proposed framework for the description of plant metabolomics experiments and their results. *Nature Biotechnology*. 22: 1601-1606

### Proceedings Chapters

1. **Nikolau, B.J.**, J. Croxdale, T.H. Ulrich, and E.S. Wurtele. 1987. Acetyl-CoA carboxylase and biotin-containing proteins in carrot somatic embryogenesis. *In Metabolism Structure and Function of Plant Lipids* (P.K. Stumpf, J.B. Mudd, and W.D. Nes, eds.), Plenum Press, NY, pp. 517-519.
2. Caffrey, J.J., Y. Chen, T. Diez, X. Guan, J-Y. Huang, A. McKean, J. Song, X-M. Shang, X. Wang, L.M. Weaver, E.S. Wurtele and **B.J. Nikolau**. 1995. Biochemical and molecular biological characterization of biotinylated proteins of plants. *In Plant Lipid Metabolism*. (J-D. Kader and P. Mazliak eds.). Kluwer Academic Publishers, pp. 49-51.
3. **Nikolau, B.J.**, J.J. Caffrey, T. Diez, J-Y. Huang, X-M Shang, L.M. Weaver and E.S. Wurtele. 1995. Biochemical and molecular biological characterization of acetyl-CoA

- carboxylases. *In Plant Lipid Metabolism*. (J-D. Kader and P. Mazliak eds.). Kluwer Academic Publishers, pp. 39-42.
4. **Nikolau, B.J.**, X. Xu, Y. Xia, J. Hansen, S. Heinen, T-J. Wen, M. Delledonne and P.S. Schnable. 1995. Molecular cloning and characterization of genes involved in cuticular wax biosynthesis. *In Plant Lipid Metabolism*. (J-D. Kader and P. Mazliak eds.). Kluwer Academic Publishers, pp. 127-130.
  5. Hansen, J.D., C. Dietrich, Y. Xia, X. Xu, T-J. Wen, M. Delledonne, D.S. Robertson, P.S. Schnable and **B.J. Nikolau**. 1997. Molecular biology of genes involved in cuticular wax biosynthesis. *In Physiology, Biochemistry and Molecular Biology of Plant Lipids*. (J.P. Williams, M.U. Khan, N.W. Lem eds.). Kluwer Academic Publishers, pp. 336-338.
  6. Choi, J-K., J. Ke, A.L. McKean, L.M. Weaver, T-N. Wen, J. Sun, T. Diez, F., Yu, X. Guan, E.S. Wurtele and **B.J. Nikolau**. 1997. Molecular biology of biotin-containing enzymes required in lipid metabolism. *In Physiology, Biochemistry and Molecular Biology of Plant Lipids*. (J.P. Williams, M.U. Khan, N.W. Lem eds.). Kluwer Academic Publishers, pp. 363-367.
  7. **Nikolau, B.J.**, J., Ke, J-K., Choi, E.S., Wurtele. 1999. *In situ* and transgenic studies of the regulation of acetyl-CoA carboxylase gene expression. Proceedings of the 13<sup>th</sup> International Symposium on Plant Lipids, Sevilla, Spain. J. Sanchez, ed. Kluwer Press. pp. 50-53.
  8. Wurtele, ES, **BJ Nikolau**, PS Schnable, DJ Oliver, J Ke, RH Behal. 1999. Molecular Biology of Acetyl-CoA Generation. Proceedings of the 13<sup>th</sup> International Symposium on Plant Lipids, Sevilla, Spain. J. Sanchez, ed. Kluwer Press. pp. 54-56.
  9. **Nikolau, B.J.**, Wurtele, E.S., Oliver, D.J., P.S. Schnable. 2000. Molecular biology of acetyl-CoA metabolism. The Proceedings of the 14<sup>th</sup> International Symposium on Plant Lipids, Cardiff, Wales. *Biochemical Society Transactions*. 28:591-593.
  10. Fatland, B., M. Anderson, **B.J. Nikolau** and E.S. Wurtele. 2000. Molecular biology of cytosolic acetyl-CoA generation. The Proceedings of the 14<sup>th</sup> International Symposium on Plant Lipids, Cardiff, Wales. *Biochemical Society Transactions*. 28:593-595.
  11. Perera, M.A.D.N., Dietrich, C.R., Meeley, R., Schnable, P.S., **Nikolau, B.J.** 2003. Dissecting the maize epicuticular wax biosynthetic pathway via the characterization of an extensive collection of *glossy* mutants. *In Advanced Research on Plant Lipids*. (eds. M Murata, M Yamada, I Nishida, H Okuyama, J Sekiya, W Hajima, H Wada) Kluwer Academic Press, Boston, pp. 225-228.

## **Books**

**B.J. Nikolau** and E.S., Wurtele (editors). 2007. *Concepts in Plant Metabolomics*. Springer Press. A 21 chapter, 355-page edited book; ISBN-10: 1-4020-5607-9.

**GRADUATE STUDENTS:** The following graduate students completed the research requirement of their degree in the Nikolau laboratory.

**Name of student:** Hsiaopo Cheng  
**Title of thesis:** Structures of Seed Triacylglycerides Containing Petroselinic Acid or Erucic Acid.  
**Year Graduated:** 1991  
**Degree:** MSc, Biochemistry  
**Subsequent position:** Research associate at New Orleans University, New Orleans.

**Name of student:** Terence Hung-Wa Hui  
**Title of thesis:** Biochemical Characterization of Stearoyl-ACP Desaturase in Soybeans.  
**Year Graduated:** 1992  
**Degree:** MSc, Biochemistry  
**Subsequent position:** Research associate with Amgen, San Francisco.

**Name of student:** Michael Tomas McDowell  
**Title of thesis:** Isolation and Characterization of Genes Coding for Biotin-Containing Enzymes.  
**Year Graduated:** 1992  
**Degree:** MSc, Biochemistry  
**Subsequent position:** PhD graduate student at University of California, Davis.  
Research associate with Invitrogen.

**Name of student:** Jianping Song  
**Title of thesis:** Molecular Cloning and Characterization of 3-Methylcrotonyl-CoA Carboxylase from Soybean.  
**Year Graduated:** 1993  
**Degree:** PhD, Biochemistry  
**Subsequent position:** Research scientist, Bristol, Myers, Squibbs, Connecticut

**Name of student:** Xun Wang  
**Title of thesis:** Characterization of  $\beta$ -Methylcrotonyl-CoA Carboxylase of Tomato: A Newly Identified Biotin Enzyme in Plants.  
**Year Graduated:** 1993  
**Degree:** PhD, Biochemistry  
**Subsequent position:** Chief Scientist, Syngenta, China.

**Name of student:** Tomas Diez  
**Title of thesis:** Biochemical Characterization of Plant Biotin-Containing Enzymes  
**Year Graduated:** 1994  
**Degree:** PhD, Biochemistry  
**Subsequent position:** Professor of Biochemistry, University of Panama, Panama

**Name of student:** James Caffrey  
**Title of thesis:** Biochemical and Molecular Biological Characterization of Plant acetyl-CoA carboxylases  
**Year Graduated:** 1995  
**Degree:** PhD, Molecular, Cellular and Developmental Biology  
**Subsequent position:** Post-doctoral fellow at National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina.

**Name of student:** Linsen Liu  
**Title of thesis:** Observations on the Biosynthesis of  $\gamma$ -Eleostearic Acid and Vernolic Acid, and the Accumulation of Petroselinic Acid in Somatic Carrot Embryos.  
**Year Graduated:** 1995  
**Degree:** PhD, Food Science/Biochemistry  
**Subsequent position:** Scientist, Cargill Seeds, Minnessota

**Name of student:** Ping Li  
**Title of thesis:** Molecular Biology of the Biosynthesis of Monoenoic Fatty Acids in Carrot Seeds.  
**Year Graduated:** 1995  
**Degree:** MSc, Food Science  
**Subsequent position:** Research associate, ExSeeds Genetics, Ames.

**Name of student:** Joong-Kook Choi  
**Title of thesis:** Molecular Characterization of the Chloroplastic Acetyl-CoA Carboxylase of *Arabidopsis thaliana*.  
**Year Graduated:** 1996  
**Degree:** PhD, Molecular, Cellular and Developmental Biology  
**Subsequent position:** Post-doctoral research associate, Department. of Microbiology and Molecular Genetics, Harvard Medical School, Boston.

**Name of student:** Angela L. McKean  
**Title of thesis:** Molecular Biology of the 3-Methylcrotonyl-CoA Carboxylase Subunits.  
**Year Graduated:** 1996  
**Degree:** MSc, Biochemistry  
**Subsequent position:** Research scientist, BASF Plant Research, North Carolina.

**Name of student:** Tuan-Nan Wen  
**Title of thesis:** Molecular Characterization of Regulatory and Structural Properties of Plant Biotin-Containing Enzymes  
**Year Graduated:** 1997  
**Degree:** PhD, Biochemistry  
**Subsequent position:** Scientist at Institute of Botany, Academia Sinica, Taipei, Taiwan.



**Name of student:** Devlina Lahiri  
**Title of thesis:** Biochemical Characterization of Branched-Chain Fatty Acid Biosynthesis  
**Year Graduated:** 1997  
**Degree:** MSc, Biochemistry  
**Subsequent position:** Research Scientist, The Monsanto Co., St. Louis, MO

**Name of student:** Christy Allred  
**Title of thesis:** Regulation of acetyl-CoA carboxylase gene expression  
**Year Graduated:** 1999  
**Degree:** MSc, Biochemistry  
**Subsequent position:** Research Scientist, Mayo Clinic, Rochester, MN.

**Name of student:** Ping Che  
**Title of thesis:** Biochemical and molecular genetic studies of the metabolic role of methylcrotonyl-CoA carboxylase  
**Year Graduated:** 2000  
**Degree:** Ph.D., Biochemistry  
**Subsequent position:** Post-doctoral research associate, Iowa State University

**Name of student:** Li Wei Cui  
**Title of thesis:** Molecular biology of ATP citrate lyase  
**Year Graduated:** 2001  
**Degree:** MSc, Molecular, Cellular and Developmental Biology  
**Subsequent position:** Research Scientist, University of Texas Southwestern Medical Center, Dallas, TX.

**Name of student:** Ann Perera  
**Title of thesis:** Molecular genetics and metabolomics of cuticular waxes  
**Year Graduated:** 2006  
**Degree:** Ph.D., Plant Biology  
**Subsequent position:** Manager, W.M. Keck Metabolomics Research Laboratory, Iowa State University

**Name of student:** Li Xu  
**Title of thesis:** Molecular biology of acetyl-CoA carboxylase  
**Year Graduated:** 2006  
**Degree:** Ph.D., Biochemistry  
**Subsequent position:** Post-doctoral researcher, Dept. Biochemistry, Purdue University; Assistant Professor, Plants for Human Health Institute, North Carolina State University,

**Name of student:** Geng Ding  
**Title of thesis:** Molecular biology of methylcrotonyl-CoA carboxylase  
**Year Graduated:** 2008  
**Degree:** Ph.D., Molecular, Cellular and Developmental Biology  
**Subsequent position:** Post-doctoral researcher, Iowa State University

**Name of student:** Joel Schmidt  
**Title of thesis:** Molecular biology of acetyl-CoA metabolism  
**Year Graduated:** 2008  
**Degree:** Ph.D., Biochemistry  
**Subsequent position:** Scientist, Pioneer Hi-Bred/DuPont, Johnston, IA

**Name of student:** Yuqin Jin  
**Title of thesis:** Regulation of branched chain fatty acid biosynthesis  
**Year Graduated:** 2008  
**Degree:** Ph.D., Biochemistry  
**Subsequent position:** University of Iowa Law School

**Name of student:** Elve Chen  
**Title of thesis:** Molecular genetics of biotin biosynthesis in plants  
**Year Graduated:** 2008  
**Degree:** M.Sc., Plant Biology  
**Subsequent position:** PhD student, University of Hong Kong

**Name of student:** Stephanie Moon  
**Title of thesis:** Metabolomics as a tool in functional genomics  
**Year Graduated:** 2008  
**Degree:** MSc, Plant Biology  
**Subsequent position:** Scientist, Pioneer Hi-Bred/DuPont, Johnston, IA

**Name of student:** Huanan Jin  
**Title of thesis:** Molecular biology of acetyl-CoA metabolism – committing carbon to isoprenoids biosynthesis  
**Year Graduated:** 2010  
**Degree:** Ph.D., Plant Biology  
**Subsequent position:** Post doctoral researcher, Iowa State University

**Name of student:** Lucas Showman  
**Title of thesis:** Identification and molecular characterization of the Arabidopsis homolog to the Saccharomyces cerevisiae BIO5 gene  
**Year Graduated:** 2009  
**Degree:** M.Sc., Biochemistry  
**Subsequent position:** Graduate Research Assistant, Iowa State University

**Name of student:** Alexis Hoffmann  
**Title of thesis:** Fatty acid elongase (FAE) systems: An investigation of genetic redundancy  
**Year Graduated:** 2011  
**Degree:** Ph.D., Plant Biology  
**Subsequent position:** Post doctoral researcher, Iowa State University

**Name of student:** Xiaobin Zheng  
**Title of thesis:** The CER2 protein co-localizes to the nucleus and the endoplasmic reticulum and is required for the accumulation of surface lipids in *Arabidopsis*  
**Year Graduated:** 2011  
**Degree:** M.Sc., Biochemistry  
**Subsequent position:** PhD program, University of Illinois

**Name of student:** Daolin Cheng  
**Title of thesis:** Wax Ester Biosynthesis  
**Year Graduated:** 2013  
**Degree:** Ph.D., Genetics  
**Subsequent position:** MSc student, Major in Computer Science, Iowa State University

**Name of student:** Shivani Garg  
**Title of thesis:** Understanding and engineering KASIII enzymes  
**Year Graduated:** 2013  
**Degree:** Ph.D., Molecular, Cellular and Developmental Biology  
**Subsequent position:** Post doctoral researcher, Rice University

**Name of student:** Fuyuan Jing  
**Title of thesis:** Characterization of acyl-ACP thioesterases for diversifying fatty acid synthesis pathway  
**Year Graduated:** 2013  
**Degree:** Ph.D., Biochemistry  
**Subsequent position:** Post doctoral researcher; President of VariFAS Biorenewables LLC

**Name of student:** Jason Hart  
**Title of thesis:** Characterization of acyl-ACP thioesterases for diversifying fatty acid synthesis pathway  
**Year Graduated:** 2013  
**Degree:** M.Sc., Biochemistry  
**Subsequent position:** PhD program, Colorado State University

**Name of student:** Lucas Showman  
**Title of thesis:** Metabolomics based gene function annotation in *Escherichia coli* and *Methanosarcina acetivorans* with genetic gain- or loss-of-function strains  
**Year Graduated:** 2014  
**Degree:** Ph.D., Biochemistry  
**Subsequent position:** Post doctoral researcher, Iowa State University; Associate Scientist, WM Keck Metabolomics Research Laboratory, Iowa State University

**Name of student:** Bryon Upton  
**Title of thesis:** Biochemical characterization of the biotin-dependent carboxylases, acetyl-CoA carboxylase and 3-methylcrotonyl-CoA carboxylase  
**Year Graduated:** 2014  
**Degree:** Ph.D., Biochemistry  
**Subsequent position:** Post doctoral researcher, Iowa State University

**Name of student:** Xin Guan  
**Title of thesis:** Enzymatic components and physiological roles of mitochondrial fatty acid biosynthesis in plants  
**Year Graduated:** 2014  
**Degree:** Ph.D., Biochemistry  
**Subsequent position:** Post doctoral researcher, Iowa State University

#### **Training in progress:**

**Name of student:** Jennifer Chmielowski  
**Degree pursued:** Ph.D., Biochemistry

**Name of student:** Adarsh Jose  
**Degree pursued:** Ph.D., Bioinformatics and Computational Biology

**Name of student:** Liza Alexander  
**Degree pursued:** Ph.D., Molecular, Cellular and Developmental Biology

**Name of student:** Jennifer Robinson  
**Degree pursued:** M.S., Biochemistry

**Name of student:** Naazneen Sofeo  
**Degree pursued:** Ph.D., Biochemistry

**Name of student:** Keting Chen  
**Degree pursued:** Ph.D., Bioinformatics and Computational Biology

**Name of student:** Kiran-Kumar Shivaiah  
**Degree pursued:** Ph.D., Biochemistry

**Name of student:** Bri Vidrine  
**Degree pursued:** Ph.D., Genetics

**Name of student:** Stephanie Ikediobi  
**Degree pursued:** M.S., Genetics

**Name of student:** Xinyu Fu  
**Degree pursued:** Ph.D., Plant Biology

**Name of student:** Elizabeth Chatt  
**Degree pursued:** Ph.D., Plant Biology

**Name of student:** Kayla Flyckt  
**Degree pursued:** M.S., Molecular, Cellular and Developmental Biology

**Name of student:** Troy Bunch  
**Degree pursued:** M.S., Molecular, Cellular and Developmental Biology

**Name of student:** Kenna Goodlaxson  
**Degree pursued:** PhD, Molecular, Cellular and Developmental Biology

**Name of student:** Sara Hazinia  
**Degree pursued:** Ph.D., Genetics

**Following scientists or postdoctoral research associates have been in the Nikolau laboratory:**

Greg Keller, MS, (research associate), September, 1988 - November 1989. Currently, research associate with AgroCetus, Madison, Wisconsin.

Dr. Laura Civardi, Ph.D.(post-doctoral research associate), January 1991 - May, 1994. Currently, research scientist, University of Barcelona, Barcelona, Spain.

Dr. Lisa M. Weaver, Ph.D. (post-doctoral research associate), April 1992 - October, 1996. Currently, Research Scientist, Monsanto, St. Louis.

Wei Huang, MS, (research associate), November 1998 -1990. Currently Assistant Scientist II, Crop Genome Lab, Iowa State University.

Dr. Cunxi Wang, Ph.D. (post-doctoral research associate), February 2001-September, 2001. Currently Research Scientist, Pioneer Hi-Bred International, Johnston, IA

Dr. Beth Fatland, Ph.D. (post-doctoral research associate), January 2003-August, 2004. Currently, Senior Research Scientist, Archer Daniel Midlands, Decatur, IL.

Dr. Cyril Periappuram, Ph.D. (post-doctoral research associate), 2001-2005. Currently Plant Biotechnology Institute, National Research Council Canada

Dr. Ann Perera, Ph.D. (associate scientist), February, 2004-present. Currently Manager, WM Keck Metabolomics Research Laboratory, Iowa State University

Dr. Vandana Mhaske, Ph.D. (post-doctoral research associate), October 2004-2008. Currently Abasaheb Garware College, India

Dr. Wenxu Zhou, Ph.D. (post-doctoral research associate), December 2005-2008, Currently Researcher, University of Western Australia, ARC Centre of Excellence in Plant Energy Biology, Australia.

Dr. Zhihong Song, Ph.D. (Research Scientist), May 2008-December, 2013  
Currently U.S. Food and Drug Administration, Washington, DC

Dr. Marna Yandea-Nelson, Ph.D. (associate scientist), December 2008-August, 2014;  
Currently Assistant Professor, Department GDCB, Iowa State University

Dr. Shivani Garg, Ph.D. (post-doctoral research associate), January 2014-January 2016.  
Currently post-doctoral research associate, Rice University, Houston, TX.

Dr. Xiaochen Yu, Ph.D. (post-doctoral research associate), July 2014-December 2015.  
Currently on leave.

Dr. Lucas Showman, Ph.D. (post-doctoral research associate), August 2014-August 2015.  
Currently Assistant Manager, WM Keck Metabolomics Research Laboratory, Iowa State University.

Dr. Bryon Upton, Ph.D., (post-doctoral research associate), August 2014-present

Dr. Xin Guan, Ph.D., (post-doctoral research associate), August 2014-present

Dr. Libuse Brachova, Ph.D. (associate scientist), February, 2001-present

Dr. Ludmila Rizshsky, Ph.D. (associate scientist), February, 2007-present

Dr. Geng Ding, Ph.D. (post-doctoral research associate), May 2008-January 2012 and  
March 2014-July 2015; (assistant scientist) August 2015-present

Dr. Alexis Hoffman Campbell, Ph.D. (post-doctoral research associate) January 2012-  
May 2015; (associate scientist) May 2015-present

Dr. Bo Xie, Ph.D. (associate scientist), October, 2014-present

Dr. Rupam Bhunia, Ph.D. (post-doctoral research associate), July 2015-present.

Dr. Ryan Sturms, Ph.D., (post-doctoral research associate), January 2016-present.

## PAST RESEARCH SUPPORT

**PROJECT TITLE:** Regulation of Fatty Acid Biosynthesis  
**SUPPORTING AGENCY:** State of Iowa  
**AMOUNT:** \$150,000 - 8/88-7/94

**PROJECT TITLE:** Regulation of Very Long Chain Fatty Acid Biosynthesis  
**SUPPORTING AGENCY:** Center for Crop Utilization Research, ISU  
**AMOUNT:** \$32,800 - 1/89-12/90

**PROJECT TITLE:** Biochemical and Genetic Characterization of a High Stearic Acid Mutant of Soybean  
**SUPPORTING AGENCY:** Iowa Soybean Promotion Board  
**AMOUNT:** \$58,285 - 7/89-12/92

**PROJECT TITLE:** Cloning of Maize *Glossy* Genes via Transposable Element Tagging  
**SUPPORTING AGENCY:** ISU research grant  
**AMOUNT:** \$7,435 - 5/89-4/90

**PROJECT TITLE:** Molecular Cloning and Characterization of the Acetyl-CoA Carboxylase Gene From Soybean  
**SUPPORTING AGENCY:** Pioneer Hi-Bred Int'l, Inc  
**AMOUNT:** \$60,000 - 11/89-12/93

**PROJECT TITLE:** Structure and Function of a Novel Biotin Enzyme (PI, Nikolau, Co-PI E.S. Wurtele)  
**SUPPORTING AGENCY:** National Science Foundation  
**AMOUNT:** \$140,000 - 8/90-1/92

**PROJECT TITLE:** Molecular Biology of Cuticular Wax Biosynthesis (PI, P.S. Schnable, co-PI Nikolau)  
**SUPPORTING AGENCY:** National Science Foundation  
**AMOUNT:** \$265,000 - 1/91-4/94

**PROJECT TITLE:** Fine Structure Physical Mapping of Maize Chromosomes (PI, Nikolau, co-PI P.S. Schnable)  
**SUPPORTING AGENCY:** Midwest Plant Biotechnology Consortium  
**AMOUNT:** \$61,875 - 1/91-12/92

**PROJECT TITLE:** Characterization of the Acetyl-CoA Carboxylase Genes of Soybean (PI, Nikolau, co-PI, E.S. Wurtele)  
**SUPPORTING AGENCY:** Midwest Plant Biotechnology Consortium  
**AMOUNT:** \$173,679 - 7/91-12/93

**PROJECT TITLE:** Isolation, Characterization and Manipulation of the Acetyl-CoA Carboxylase Genes of Soybean  
**SUPPORTING AGENCY:** Iowa Soybean Promotion Board (PI, Nikolau, co-PI, E.S. Wurtele)  
**AMOUNT:** \$105,000 - 7/91-8/94



**PROJECT TITLE:** Technology for the Physical Mapping of the Maize Genome (PI, Nikolau, co-PI, P.S. Schnable)  
**SUPPORTING AGENCY:** Midwest Plant Biotechnology Consortium  
**AMOUNT:** \$104,595 - 10/92-9/94

**PROJECT TITLE:** Introduction of Exotic Fatty Acids into Soybean Oil  
**SUPPORTING AGENCY:** Iowa Soybean Promotion Board (PI, Nikolau, co-PI, E.G. Hammond)  
**AMOUNT:** \$52,500 - 7/91-6/94

**PROJECT TITLE:** The Herman Frasch Foundation (American Chemical Society)  
**SUPPORTING AGENCY:** The Chemistry and Biochemistry of Uncommon Plant Lipids  
**AMOUNT:** \$85,000 - 7/92-6/97

**PROJECT TITLE:** Molecular Biology of Cuticular Wax Biosynthesis (PI, P.S. Schnable, co-PI Nikolau)  
**SUPPORTING AGENCY:** National Science Foundation  
**AMOUNT:** \$305,000 - 4/94-7/97

**PROJECT TITLE:** Alteration of Soybean seed oil and Protein Content by Manipulating the Expression of the Acetyl-CoA Carboxylase Gene (PI, Nikolau, co-PI, E.S. Wurtele)  
**SUPPORTING AGENCY:** Iowa Soybean Promotion Board  
**AMOUNT:** \$130,360 - 7/94-6/97

**PROJECT TITLE:** Biochemistry and Metabolic Networking of Leucine Catabolism (PI, E.S. Wurtele, co-PI, Nikolau)  
**SUPPORTING AGENCY:** National Science Foundation  
**AMOUNT:** \$225,000 - 8/1/95-3/1/99

**PROJECT TITLE:** Molecular Analysis of Meiotic Recombination (PI, P.S. Schnable; co-PI, Nikolau)  
**SUPPORTING AGENCY:** USDA-NRI  
**AMOUNT:** \$115,000 - 9/1/95-8/31/97

**PROJECT TITLE:** Branched Chain Fatty Acids, a Potential High-Value Crop from Soybeans (PI E.G. Hammond, co-PI, Nikolau)  
**SUPPORTING AGENCY:** Iowa Soybean Promotion Board  
**AMOUNT:** \$67,500 - 4/1/95-3/31/99

**PROJECT TITLE:** Molecular Analysis of Meiotic Recombination (PI, P.S. Schnable, co-PI Nikolau)  
**SUPPORTING AGENCY:** USDA-NRI  
**AMOUNT:** \$100,000 - 9/1/97-8/31/99

**PROJECT TITLE:** Coordinate regulation of the acetyl-CoA carboxylase genes during seed development.  
**SUPPORTING AGENCY:** USDA-NRI (PI, Nikolau; coPI, E.S. Wurtele)

**AMOUNT:** \$90,000 - 9/97-8/00

**PROJECT TITLE:** Cis- and Trans-Modifiers of Meiotic Recombination in Maize (PI, P.S. Schnable; co-PI Nikolau)

**SUPPORTING AGENCY:** USDA-NRI

**AMOUNT:** \$150,000 - 9/99-8/01

**PROJECT TITLE:** How do plants generate acetyl-CoA? (PI, Nikolau; coPIs D.J. Oliver, P.S. Schnable and E.S. Wurtele)

**SUPPORTING AGENCY:** Consortium for Plant Biotechnology Research

**AMOUNT:** \$430,000 - 7/98-12/00

**PROJECT TITLE:** Biotechnological improvement of crops by the genetic engineering of acetyl-CoA pools (PI, Nikolau; coPIs D.J. Oliver, P.S. Schnable and E.S. Wurtele)

**SUPPORTING AGENCY:** North Central Biotechnology Initiative

**AMOUNT:** \$170,000 - 9/98-12/00

**PROJECT TITLE:** Molecular biology of plant cuticular waxes (PI, P.S. Schnable; co-PI, Nikolau)

**SUPPORTING AGENCY:** NSF

**AMOUNT:** \$300,000 - 8/98-8/01

**PROJECT TITLE:** Regulation and metabolic networking of leucine catabolism (PI, E.S. Wurtele; co-PI, B.J. Nikolau)

**SUPPORTING AGENCY:** National Science Foundation

**AMOUNT:** \$335,000 - 3/00-2/03

**PROJECT TITLE:** How is acetyl-CoA generated in plants? (PI, Nikolau; co-PIs P.S. Schnable and E.S. Wurtele)

**SUPPORTING AGENCY:** USDA-NRI

**AMOUNT:** \$225,000 - 1/01-12/03

**PROJECT TITLE:** Coordinate regulation of the acetyl-CoA carboxylase genes during seed development. (PI, Nikolau; co-PI with Wurtele)

**SUPPORTING AGENCY:** USDA-NRI

**AMOUNT:** \$130,000 - 11/00-10/02

**PROJECT TITLE:** Molecular regulation of soybean seed composition. (PI, Nikolau; co-PIs, E.S. Wurtele and M. Westgate)

**SUPPORTING AGENCY:** United Soybean Board

**AMOUNT:** \$238,464 - 6/00-5/03

**PROJECT TITLE:** Integrated Program to improve the composition and value of Iowa soybeans. (PI, M. Westgate; coPIs, Nikolau and E.S. Wurtele)

**SUPPORTING AGENCY:** Iowa Soybean Promotion Board

**AMOUNT:** \$373,776 - 9/00-8/03

**PROJECT TITLE:** Acetyl-CoA: Precursor for an alternative, biotic source of hydrocarbons. (PI, Nikolau, co-PIs D.J. Oliver, P.S. Schnable and

**SUPPORTING AGENCY:** E.S. Wurtele)  
Department of Energy, Energy Biosciences  
**AMOUNT:** \$312,000 - 8/01-9/04

**PROJECT TITLE:** Metabolomics Research Laboratory  
**SUPPORTING AGENCY:** W.M. Keck Foundation  
**AMOUNT:** \$1,000,000 - 7/01-7/05

**PROJECT TITLE:** Center for Research on Botanical Dietary Supplements. (PI, Birt, Nikolau is one of 15 co-PIs)  
**SUPPORTING AGENCY:** NIEHS  
**AMOUNT:** \$6,069,636 - 8/02-8/07

**PROJECT TITLE:** Essential nature of fatty acid elongation in plant development  
**PI:** Patrick S. Schnable  
**Co-PI:** Basil J. Nikolau  
**SUPPORTING AGENCY:** National Science Foundation  
**AMOUNT:** \$375,000 - 4/04-4/07

**PROJECT TITLE:** Biopolymers and other value-added products from distillers' dried grains.  
**PI:** Robert Brown  
**Co-PIs:** Ted Heike  
Alan Dispirito  
Basil J. Nikolau  
**SUPPORTING AGENCY:** USDA  
**AMOUNT:** \$1,000,000 - 1/04-12/06

**PROJECT TITLE:** Advanced biorefinery feedstocks.  
**PI:** Oliver Peoples, Metabolix Inc.  
**Co-PIs:** Eve S. Wurtele  
Basil J. Nikolau  
**SUPPORTING AGENCY:** USDA  
**AMOUNT:** \$2,000,000 - 1/04-12/06

**PROJECT TITLE:** Functional genomics of biotin metabolic network of Arabidopsis  
**PI:** Basil J. Nikolau  
**Co-PIs:** Eve S. Wurtele  
Hieke Hofmann  
**SUPPORTING AGENCY:** National Science Foundation  
**AMOUNT:** \$800,000 - 8/04-8/08

**PROJECT TITLE:** 2010 Metabolomics: A functional genomics tool for deciphering functions of Arabidopsis genes in the context of metabolic and regulatory networks

**PI:** Basil J. Nikolau

**Co-PIs:** Oliver Fiehn, U. California, Davis  
Sue Rhee, Stanford University  
Lloyd Sumner, Noble Foundation, Ardmore, OK  
Ruth Welti, Kansas State University

**SUPPORTING AGENCY:** National Science Foundation

**AMOUNT:** \$1,000,000 - 10/05-10/07

**PROJECT TITLE:** Mass spectrometric imaging of plant metabolites (co-PIs, Yeung, Nikolau, Hauk, Badman)

**SUPPORTING AGENCY:** Department of Energy, Office of Basic Energy Sciences

**AMOUNT:** \$1,680,000 - 10/2005-10/2008

**PROJECT TITLE:** Mass spectrometric imaging of plant metabolites

**SUPPORTING AGENCY:** Department of Energy, Office of Basic Energy Sciences

**PI:** Basil J. Nikolau, Iowa State University

**Co-PIs:** Edward Yeung, Iowa State University  
Robert S. Hauk, Iowa State University  
Young-Jin Lee, Iowa State University

**AMOUNT:** \$1,680,000 - 10/2008-10/2011

**PROJECT TITLE:** MRI: Acquisition of a high resolution Accela-LTQ FT Ultra mass spectrometer system

**SUPPORTING AGENCY:** National Science Foundation

**PI:** Basil J. Nikolau

**Co-PIs:** Young-Jin Lee  
Ann P. Perera

**AMOUNT:** \$1,077,797 - 8/2009–9/2012

**PROJECT TITLE:** Production of Bio-Based Lubricants in a Dedicated Industrial Oilseed Crop

**SUPPORTING AGENCY:** NSF/DOE/USDA/EPA Interagency Opportunities in Metabolic Engineering

**PI:** Ed Cahoon, University of Nebraska

**Co-PIs:** Tom Clemente, University of Nebraska  
Chaofu, Montana State University  
Basil J. Nikolau, Iowa State University

**AMOUNT:** \$500,000 - 8/2009–9/2012

**PROJECT TITLE:** Advancing Drug Development from Medicinal Plants using Transcriptomics and Metabolomics  
**SUPPORTING AGENCY:** National Institute of Health  
**PI:** Joe Chappel, Univ. Kentucky - lead  
**Co-PIs:** Dean Della Penna, Michigan State University  
Robin Buell, Michigan State University  
Sarah O'Connor, Massachusetts Institute of Technology  
Basil J. Nikolau, Iowa State University  
Eve S. Wurtele, Iowa State University  
**AMOUNT:** \$6,800,000 - 10/2009–10/2012

**PROJECT TITLE:** A Genetically Tractable Microalgal Platform for Advanced Biofuel Production  
**SUPPORTING AGENCY:** Department of Energy, ARPA-E  
**PI:** Martin Spalding, Iowa State University  
**Co-PIs:** Basil J. Nikolau, Iowa State University  
David Oliver, Iowa State University  
Eve Wurtele, Iowa State University  
Larry Halverson, Iowa State University  
John Morgan, University Purdue  
**AMOUNT:** \$4,500,000 - 1/2010–12/2011

**PROJECT TITLE:** I-Corps: Novel bio-based chemical feedstocks for the polymer industry  
**SUPPORTING AGENCY:** National Science Foundation  
**PI:** Basil J. Nikolau, Iowa State University  
**Co-PIs:** Peter J. Keeling, Iowa State University  
Shivani Garg, Iowa State University  
**AMOUNT:** \$50,000 - 3/2012–3/2013

**PROJECT TITLE:** GEPR/RUI: Functional genomics of nectar production in Brassicaceae  
**SUPPORTING AGENCY:** National Science Foundation  
**PI:** Clay Carter, University Minnesota, Duluth  
**Co-PI:** Basil J. Nikolau, Iowa State University  
Ann Perera, Iowa State University  
**AMOUNT:** \$118,120 - 9/2008–8/2014

**PROJECT TITLE:** 2010 Metabolomics: A Functional Genomics Tool for Deciphering Functions of Arabidopsis Genes in the Context of Metabolic and Regulatory Networks  
**SUPPORTING AGENCY:** National Science Foundation  
**PI:** Basil J. Nikolau  
**Co-PIs:** Sue Rhee, Carnegie Institute, Stanford  
Oliver Fiehn, UC Davis  
Ruth Welti, Kansas State University  
Lloyd Sumner, Samuel Roberts Noble Foundation  
**AMOUNT:** \$2,925,398 - 3/2009–3/2014

**PROJECT TITLE:** Collaborative Proposal: Biosynthesis of Alkamides - Experimental Modeling of a Modular Secondary Metabolic Pathway  
**SUPPORTING AGENCY:** National Science Foundation  
**PI:** Basil J. Nikolau, Iowa State University  
**PI:** Robert Minto, Indiana University-Purdue University at Indianapolis  
**AMOUNT:** \$1,140,000 - 8/2009–8/2014

**PROJECT TITLE:** EFRI-HyBi: Bioengineering a system for the direct production of biological hydrocarbons for biofuels  
**SUPPORTING AGENCY:** National Science Foundation  
**PI:** Jacqueline V Shanks, Iowa State University  
**PI:** Basil J. Nikolau, Iowa State University  
**Co-PIs** Thomas A Bobik, Iowa State University  
Govind Nadathur, University Puerto Rico  
Gordon V. Wolfe, California State University, Chico  
**AMOUNT:** \$2,050,000 - 8/2009–9/2014

**PROJECT TITLE:** STTR: OmegaChea – An advanced manufacturing company focused on producing sustainable bio-based commercial chemicals  
**SUPPORTING AGENCY:** National Science Foundation; STTR Phase I  
**PI:** Ludmila Rizhsky, *OmegaChea Biorenewables LLC*.  
**Co-PI:** Basil J. Nikolau, Iowa State University  
**AMOUNT:** \$225,000 - 7/2013–7/2014

**PROJECT TITLE:** SBIR Phase I: VariFAS: Biocatalysts for a scalable innovative technology to produce homogeneous sources of individual fatty acids for industrial applications  
**SUPPORTING AGENCY:** National Science Foundation; SBIR Phase I  
**PI:** Libuse Brachova, *VariFAS Biorenewables LLC*.  
**Co-PI:** Basil J. Nikolau, Iowa State University  
**AMOUNT:** \$150,000  
**DATE:** 7/2014–1/2015

#### **CURRENT RESEARCH SUPPORT:**

**PROJECT TITLE:** Engineering Research Center for Biorenewable Chemicals  
**SUPPORTING AGENCY:** National Science Foundation  
**DIRECTOR:** Brent Shanks  
**DEPUTY DIRECTOR:** Basil J. Nikolau  
**Co-PIs:** 35 faculty at 7 institutions ([www.cbirc.iastate.edu](http://www.cbirc.iastate.edu))  
**AMOUNT:** \$32,000,000  
**DATES:** 8/2008-7/2018

**PROJECT TITLE:** BIC: An Innovation Partnership to Advance a High-throughput Plant Phenotype Screening Platform  
**SUPPORTING AGENCY:** National Science Foundation  
**PIs:** Basil J. Nikolau, State University  
**Co-PIs:** Thomas Lubberstedt, Iowa State University  
Michael Crum, Iowa State University  
M. Paul Scott, Iowa State University  
**AMOUNT:** \$617,070  
**DATES:** 9/2012–8/2016

**PROJECT TITLE:** Mass spectrometric imaging of plant metabolites  
**SUPPORTING AGENCY:** Department of Energy, Office of Basic Energy Sciences  
**PI:** Basil J. Nikolau, Iowa State University  
**Co-PIs:** R.S. Hauk, Iowa State University  
Young-Jin Lee, Iowa State University  
**AMOUNT:** \$2,660,000  
**DATES:** 10/2011-10/2016

**PROJECT TITLE:** Metabolomics: Advancing the scientific promise to better understand plant specialized metabolism for a low-carbon society  
**SUPPORTING AGENCY:** National Science Foundation and Japan Science and Technology  
**PI:** Lloyd Sumner, Noble Foundations, Ardmore, OK  
**Co-PIs:** Basil J. Nikolau, Iowa State University  
Kazuki Saito, Riken Plant Science Center, Japan  
**AMOUNT:** \$2,754,116  
**DATES:** 2/2012–11/2017

**PROJECT TITLE:** RCN: Integrating and coordinating a national and international plant, algae, and microbial metabolomics research coordination network  
**SUPPORTING AGENCY:** National Science Foundation  
**PI:** Lloyd Sumner, Noble Foundations, Ardmore, OK  
**Co-PIs:** Basil J. Nikolau, Iowa State University  
Oliver Fiehn, University California, Davis  
Georg Jander, Cornell University  
James Liao, University California, Los Angeles  
**AMOUNT:** \$499,797  
**DATES:** 10/2013–10/2018

**PROJECT TITLE:** New, GK-12: Growing the Green Collar Workforce for the 21st Century  
**SUPPORTING AGENCY:** National Science Foundation  
**PI:** Basil J. Nikolau, Iowa State University  
**Co-PI:** Adah Leshem, Iowa State University  
Crista Carlile, Des Moines School District  
Denise Schmidt, Iowa State University  
Drena Dobbs, Iowa State University  
**AMOUNT:** \$2,729,630  
**DATES:** 6/2010–5/2016

**PROJECT TITLE:** IOS: Surface lipid metabolome on maize silks - Genetic regulation and protective capacity against abiotic and biotic stresses

**SUPPORTING AGENCY:** National Science Foundation

**PI:** Marna Yandea-Nelson, Iowa State University

**Co-PI:** Basil J. Nikolau, Iowa State University  
Nick Lauter, Iowa State University  
Craig Abel, Iowa State University

**AMOUNT:** \$1,654,149

**DATES:** 4/2014-3/2018

**PROJECT TITLE:** Collaborative research: Lipidomic profiling, dynamic and functions of head-group acylation of membrane lipids in plant stress responses

**SUPPORTING AGENCY:** National Science Foundation

**PI:** Ruth Welti, Kansas State University

**Co-PI:** Basil Nikolau, Iowa State University  
Eve Wurtele, Iowa State University

**AMOUNT:** \$991,602

**DATES:** 6/2014-5/2017

**PROJECT TITLE:** Comparative functional genomics of nectaries and nectar in the dicots

**SUPPORTING AGENCY:** National Science Foundation

**PI:** Clay Carter, University of Minnesota

**Co-PI:** Robert Thornburg, Iowa State University  
Basil Nikolau, Iowa State University

**AMOUNT:** \$1,814,628

**DATES:** 2/2015-1/2018

**PROJECT TITLE:** Integrated and dynamic multi-spectroscopic in situ imaging of plant metabolism at the level of subcellular compartments

**SUPPORTING AGENCY:** U.S. Department of Energy

**PI:** Basil Nikolau, Iowa State University

**Co-PI:** Diane Bassham, Iowa State University  
Robert Houk, Iowa State University  
Young-Jin Lee, Iowa State University  
Arthur Winter, Iowa State University  
Eve Wurtele, Iowa State University

**AMOUNT:** \$1,800,000

**DATES:** 7/2015-7/2018

**PROJECT TITLE:** Novel and improved bio-lubricants based on omega-hydroxy fatty acid chemistry

**SUPPORTING AGENCY:** Iowa Energy Center

**PI:** Basil Nikolau, Iowa State University

**AMOUNT:** \$45,000

**DATES:** 1/2016-6/2016



**PROJECT TITLE:** Development of a novel enzyme-enabled Raman spectroscopic imaging (e2RSI) with nano-scale resolution.  
**SUPPORTING AGENCY:** U.S. Department of Agriculture (AFRI program)  
**PI:** Chenxu Yu, Iowa State University  
**Co-PI:** Basil Nikolau, Iowa State University  
Olga Zobotina, Iowa State University  
Jigang Wang, Iowa State University  
Xinwei Wang, Iowa State University  
**AMOUNT:** \$499,900  
**DATES:** 3/2016-3/2019