

**MARNA D. YANDEAU-NELSON**

Assistant Professor, Department of Genetics, Development & Cell Biology  
NSF Engineering Research Center for Biorenewable Chemicals  
Iowa State University  
4138 Biorenewables Research Laboratory, Ames, IA 50011  
515-294-1079 / [myn@iastate.edu](mailto:myn@iastate.edu)

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**Research Expertise:** Integration of expertise in classical and molecular genetics with biochemical, molecular, bioinformatic and computational approaches to study the biosynthetic and regulatory genetic networks of metabolic traits, to increase both the fundamental knowledge of cellular metabolism and to use that knowledge for practical applications (i.e. plant breeding for resistance to stresses and the development of biorenewable chemicals and fuels).

**(a) Professional Preparation**

Drake University	Biology	B.S.	1998
Iowa State University	Genetics	Ph.D.	2005
Penn State University	Molecular Biology	Post-doc	2005-2008

**(b) Appointments**

2014-present	Assistant Professor, Department of Genetics, Development & Cell Biology, Iowa State University, Ames, IA
2009-2014	Graduate Faculty, Department of Biochemistry, Biophysics and Molecular Biology, Iowa State University, Ames, IA
2005-2008	Post-doctoral Research Associate, Department of Horticulture, Pennsylvania State University, State College, PA
1998-2005	Graduate Research Assistant, Department of Genetics, Development & Cell Biology, Iowa State University, Ames, IA
1996-1998	Research Assistant, Pioneer Hi-Bred International, Inc.

**(c) Products**

**(i) Five related publications**

1. Muszynski MG & **Yandeau-Nelson MD**. (2014) Molecular Genetics of Bioenergy Traits. In: Goldman SL & Kole C (eds) Compendium of Bioenergy Plants: Corn. CRC Press, 169-197.
2. Jing F, Cantu DC, Tvaruzkova J, Chipman J, Nikolau BJ, **Yandeau-Nelson MD**, Reilly PJ (2011) Phylogenetic and experimental characterization of an acyl-ACP thioesterase family reveals significant diversity in enzymatic specificity and activity. BMC Biochem 12:44 doi:10.1186/1471-2091-12-44
3. **Yandeau-Nelson MD**, Laurens L, Shi Z, Xia H, Smith AM, Guiltinan MJ (2011) Starch Branching Enzyme IIa is required for proper diurnal cycling of starch in leaves of *Zea mays*. Plant Physiol, 156: 479-490.
4. Xia H, **Yandeau-Nelson M**, Thompson DB, Guiltinan MJ (2011) Deficiency of maize starch-branching enzyme I results in altered starch fine structure, decreased digestibility and reduced coleoptile growth during germination. BMC Plant Biol, 11:95.
5. Perera MA, Qin W, **Yandeau-Nelson M**, Fan L, Dixon P, Nikolau BJ (2010) Biological origins of normal-chain hydrocarbons: a pathway model based on cuticular wax analyses of maize silks. Plant J, 64: 618-632.

## (ii) Five other significant publications

1. Emrich SJ, L Li, T-J Wen, **MD Yandea-Nelson**, Y Fu, L Guo, H-H Chou, S Aluru, DA Ashlock, PS Schnable (2007) Nearly identical paralogs (NIPs): implications for maize (*Zea mays* L.) genome evolution. *Genetics*, 175: 429-439.
2. **Yandea-Nelson MD**, Y Xia, J Li, MG Neuffer, PS Schnable (2006) Unequal sister chromatid and homolog recombination at a tandem duplication of the *a1* locus in maize. *Genetics*, 173: 2211-2226.
3. **Yandea-Nelson MD\***, QZ Zhou\*, H Yao\*, X Xu\*, BJ Nikolau, PS Schnable (2005) *MuDR* transposase increases the frequency of meiotic crossovers in the vicinity of a *Mu* insertion in the maize *a1* gene. *Genetics*, 169: 917-929. \* Each of these authors contributed substantially to this work.
4. Dietrich C, MA Perera, **MD Yandea-Nelson**, R Meeley, B Nikolau, P 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 J*, 42: 844-861.
5. Skibbe DS, F Liu, TJ Wen, **MD Yandea**, X Cui, J Cao, CR Simmons, PS Schnable (2002) Characterization of the aldehyde dehydrogenase gene families of *Zea mays* and *Arabidopsis*. *Plant Mol Biol*, 48:751-764.

## (d) Synergistic Activities

*Scholarship*: PI on NSF-Integrative Organismal Systems Grant, "Surface lipid metabolome on maize silks - Genetic regulation and protective capacity against abiotic and biotic stresses", Co-PIs: N Lauter, BJ Nikolau, C Abel (4/15/2014-3/31/2018).

Ad hoc reviewer for 3-7 manuscripts per year, in journals including *Plant Physiology*, *FEBS Journal*, *Biochemical Genetics*, *Theoretical and Applied Genetics*, and *BMC Plant Biology*.

Recent invited seminars at the 55<sup>th</sup> Annual Maize Genetics Conference, St. Charles, IL ("Defining the genetic and metabolic networks responsible for surface hydrocarbon production on maize silks"; March 2013) and at the Interdisciplinary Life Science Consortium (ILSC) Monthly Seminar, University of Minnesota Duluth ("Fatty Acids: Paths to Biorenewable Chemicals, Fuels and Plant Protection"; February 2013).

*Advising*: As graduate faculty, serve(d) on the POS committees of 13 graduate students (co-major professor to 5 students); have served as research mentor for 17 graduate students, 15 undergraduates (6 REU students), 2 high school teachers, and 1 high school student.

*Mentoring*: Serve as advisor and mentor to the Student Leadership Council (graduates and undergraduates) in the NSF-Engineering Research Center for Biorenewable Chemicals.

*Outreach*: Conduct tours of biorenewable research labs, lead hands-on science modules for SCIENCE BOUND program and speak about research opportunities to under-represented middle and high school students (2010-present).

*Entrepreneurial Activities and Patents*: Invention Disclosures (ISURF Disclosures 03919 and 04081) and associated Provisional US Patent Applications #61/512,373 ("Materials and methods for using an acyl-acyl carrier protein thioesterase and mutants thereof in fatty acid synthesis", BJ Nikolau, **MD Yandea-Nelson**, F Jing, 2011) and #61/755,946 ("Materials and methods for using a 3-ketoacyl-acyl carrier protein (ACP) synthase III (KASIII) for production of bi-functional fatty acids", BJ Nikolau, **MD Yandea-Nelson**, S Garg, H Jin, 2013). Co-founder and co-owner of two start-ups, *OmegaChea Biorenewables LLC* and *VariFAS Biorenewables LLC*.