

Aymerick Eudes, Ph.D.

Deputy Director of Cell Wall Biology & Engineering
Deputy Vice President of Feedstocks
Joint BioEnergy Institute, Emeryville, CA
Lawrence Berkeley National Laboratory

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Research Experience

- Oct. 2016 – Present** **Biological Engineer Career Scientist**
Lawrence Berkeley National Laboratory
Biosciences Area
Berkeley, CA
- Oct. 2020 – Present** **Deputy Vice-President of Feedstocks**
Joint BioEnergy Institute, Feedstocks Division,
Emeryville, CA
- April 2016 – Present** **Deputy Director of Cell Wall Engineering**
Joint BioEnergy Institute, Feedstocks Division,
Emeryville, CA
- Jan. 2011 – Oct. 2016** **Biologist Project Scientist**
Joint BioEnergy Institute, Feedstocks Division,
Emeryville, CA
Supervisor: Dr Dominique Loqué
- Jan. 2009 - Dec. 2010** **Biologist Post-Doctoral Fellow**
Joint BioEnergy Institute, Feedstocks Division,
Emeryville, CA
Supervisor: Dr Dominique Loqué
- Jan. 2006 - Dec. 2008** **Postdoctoral Associate**
University of Florida, Horticultural Sciences
Supervisor: Prof. Andrew D. Hanson
- Sep. 2001 - Dec. 2005** **Ph.D. and Master Student**
INRA Versailles, Cellular Biology Laboratory (France)
Supervisor: Prof. Lise Jouanin
- Apr. 2001 - Aug. 2001** **Undergraduate Student**
INRA Dijon (France), Legume Physiology and Genetics Research Unit
Supervisor: Prof. Sergio J. Ochart

Supervisory Experience

- Mar 2020 - Present Yang Tian, Research Associate, LBNL
Sept 2018 – Feb 2020 Jasmine Ortega, Research Assistant, LBNL
Apr 2018 – Present Chien-Yuan Lin, Postdoctoral Scholar, LBNL

May – Jul 2018	Pablo Bouchez, Master student, Polytech Clermont-Ferrand (France)
May – Jul 2018	Delphine Khuu, Master student, Polytech Clermont-Ferrand (France)
Mar – Jul 2018	Jessica Trinh, Research Assistant, LBNL
Mar – Sep 2016	Saeed Nassef, Undergraduate student, UC Berkeley
Mar – Sep 2016	Roland Berthomieu, Master student, École Polytechnique (France)
Feb 2016 – Apr 2017	Lucien Roux, Master student, École Polytechnique Fédérale de Lausanne (Switzerland)
Nov 2014 – Jun 2016	Anagh Sinha, , Undergraduate student, UC Berkeley
Nov 2014 – Jun 2016	Nanxia Zhao, Undergraduate student, UC Berkeley
Feb 2014 – Sep 2016	Veronica Teixeira Benites, Undergraduate student, UC San Francisco
Jul – Oct 2015	Maxence Mouille, Master student, University of Tours (France)
Feb 2014 – May 2015	Sasha Yogiswara, Undergraduate student, UC Berkeley
Jan – Jul 2011	Valerie Cornuault, Master student, University of Leeds (UK)
Jan – Jul 2010	Davy Baratiny, Master student, University of Strasbourg (France)
Jan – Aug 2005	Guillaume Le Mignon, Master student, University of Paris VII (France)

Education

- 2005 **Doctorate****
University of Paris XI, France
French National Institute for Agricultural Research (INRA), Versailles
Supervisor: Prof. Lise Jouanin
Thesis: Characterization of new genes involved in secondary cell wall formation in Arabidopsis
- 2002 **Master's Degree****
University of Paris XI / AgroParisTech, France
Subject: Plant Molecular and Cellular Physiology
Dissertation: Identification of new genes involved in secondary cell wall formation in Arabidopsis
- 2001 **Bachelor's Degree****
University of Caen, France
Subject: Biology and Ecosystems

Publications

- 36) Lin CY, Vuu K, Amer B, Shih P, Baidoo E, Scheller H, **Eudes A** (2021) In-planta production of the biodegradable polyester precursor 2-pyrone-4, 6-dicarboxylic acid (PDC): Stacking reduced biomass recalcitrance with value-added co-product. **Metab Eng** 66:148-156
- 35) Hao Z, Yogiswara S, Wei T, Teixeira Benites V, Sinha A, Wang G, EK Baidoo E, Ronald P, Scheller H, Dominique Loqué D, **Eudes A** (2021) Expression of a bacterial 3-dehydroshikimate dehydratase (QsuB) reduces lignin and improves biomass saccharification efficiency in switchgrass (*Panicum virgatum* L.). **BMC plant biol** 21:1-8
- 34) Lin C-Y and **Eudes A** (2020) Strategies for the production of biochemicals in bioenergy crops. **Biotechnol Biofuels**, 13:71
- 33) Jacquet N, **Eudes A**, Tanmoy Dutta T, Kim KH, Bouxin F, Benites V, Baidoo E, Singh S, Simmons B, Loque D, Richel A (2020) Influence of hydrocracking and ionic liquid pretreatments on composition and properties of Arabidopsis thaliana wild type and CAD mutant lignins. **Renewable Energy**, 152:1241-1249

- 32) Mnich E, Bjarnholt N, **Eudes A**, Harholt J, Holland C, Jørgensen B, Larsen FH, Liu M, Manat R, Meyer AS, Mikkelsen J, Motwawie M, Muschiol J, Møller B, Møller S, Perzon A, Petersen B, Ravn J, Ulvskov P (2020) Phenolic cross-links: Building and de-constructing of the plant cell wall. **Nat Prod Rep**, 37:919-961
- 31) Kim KH, Wang Y, Takada M, **Eudes A**, Geun Yoo C, Soo Kim C, Saddler J (2019) Deep eutectic solvent pretreatment of transgenic biomass with increased C6C1 lignin monomers. **Front Plant Sci**, 10:1774
- 30) Kim KH, **Eudes A**, Jeong K, Yoo CG, Kim CS, Ragauskas A (2019) Integration of renewable deep eutectic solvents with engineered biomass to achieve a closed-loop biorefinery. **Proc Natl Acad Sci U.S.A** 116:13816-13824
- 29) Baral NR, Sundstrom ER, Das L, Gladden J, **Eudes A**, Mortimer JC, Singer SW, Mukhopadhyay A, Scown CD (2019) Approaches for more efficient biological conversion of lignocellulosic feedstocks to biofuels and bioproducts. **ACS Sustainable Chem** 7:9062-9079
- 28) Bouchez P, Teixeira Benites V, Baidoo EEK, Mortimer JC, Sullivan ML, Scheller HV, **Eudes A** (2019) Production of clovamide and its analogs in *Saccharomyces cerevisiae* and *Lactococcus lactis*. **Lett Appl Microbiol** 69:181-189
- 27) Rodriguez A, Ersig N, Geiselman GM, Seibel K, Simmons BA, Magnuson JK, **Eudes A**, Gladden JM (2019) Conversion of depolymerized sugars and aromatics from engineered feedstocks by two oleaginous red yeasts. **Bioresour Technol** 286:121365
- 26) Dong J, Chen Y, Benites VT, Baidoo EEK, Petzold CJ, Beller HR, **Eudes A**, Scheller HV, Adams PD, Mukhopadhyay A, Simmons BA, Singer SW (2019) Methyl ketone production by *Pseudomonas putida* is enhanced by plant-derived amino acids. **Biotechnol Bioeng** 116:1909-1922
- 25) Liang Y, **Eudes A**, Yogiswara S, Jing B, Benites V, Yamanaka R, Cheng-Yue C, Baidoo E, Mortimer J, Scheller H, Loqué D (2019) A screening method to identify efficient sgRNAs in Arabidopsis, used in conjunction with cell-specific lignin reduction. **Biotechnol Biofuels** 12:130
- 24) Li G, Jones K, **Eudes A**, Pidatala V, Sun J, Xu F, Zhang C, Wei T, Jain R, Birdseye D, Canlas P, Baidoo E, Duong P, Sharma M, Singh S, Ruan D, Keasling J, Mortimer J, Loqué D, Bartley L, Scheller H, Ronald P (2018) Overexpression of a rice BAHD acyltransferase gene in switchgrass (*Panicum virgatum* L.) enhances saccharification. **BMC Biotech** 18:54
- 23) Yan J, Aznar A, Chalvin C, Birdseye D, Baidoo E, **Eudes A**, Shih P, Loqué D, Zhang A, Scheller HV (2018) Increased drought tolerance in plants engineered for low lignin and low xylan content. **Biotechnol Biofuels** 11:195
- 22) **Eudes A**, Berthomieu R, Hao Z, Benites VT, Baidoo EEK, Loqué D (2018) Production of muconic acid in plants. **Metab Eng** 46:13-19
- 21) Wu W, Dutta T, Varman A, **Eudes A**, Manalansan B, Loqué D, Singh S (2017) Lignin Valorization: Two Hybrid Biochemical Routes for the Conversion of Polymeric Lignin into Value-added Chemicals. **Sci Rep** 7:8420
- 20) **Eudes A**, Dutta T, Deng K, Jacquet N, Sinha A, Benites VT, Baidoo EEK, Richel A, Sattler SE, Northen TR, Singh S, Simmons BA, Loqué D (2017) SbCOMT (Bmr12) is involved in the biosynthesis of tricinnalbin in sorghum. **PLOS ONE** 12:e0178160
- 19) **Eudes A**, Mouille M, Robinson DS, Benites VT, Wang G, Roux L, Tsai YL, Baidoo EE, Chiu TY, Heazlewood JL, Scheller HV, Mukhopadhyay A, Keasling JD, Deutsch S, Loqué D (2016) Exploiting members of the BAHD acyltransferase family to synthesize multiple hydroxycinnamate and benzoate conjugates in yeast. **Microb Cell Fact** 15:198

- 18) **Eudes A**, Zhao N, Sathitsuksanoh N, Baidoo E, Lao J, Wang G, Yogiswara S, Lee TS, Singh S, Mortimer J, Keasling J, Simmons B and Loque D (2016) Expression of S-adenosylmethionine Hydrolase in Tissues Synthesizing Secondary Cell Walls Alters Specific Methylated Cell Wall Fractions and Improves Biomass Digestibility. **Frontiers Bioeng Biotechnol** 4:58
- 17) **Eudes A**, Yogiswara S, Wang G, Teixeira Benites V, Baidoo EEK, Lee TS, Keasling JD, Loqué D (2016) Exploiting The Substrate Promiscuity of Hydroxycinnamoyl-CoA:shikimate Hydroxycinnamoyl Transferase to Reduce Lignin. **Plant Cell Physiol** 57:568-579
- 16) **Eudes A**, Teixeira Benites V, Wang G, Baidoo EEK, Lee TS, Keasling JD, Loqué D (2015) Precursor-directed combinatorial biosynthesis of cinnamoyl, dihydrocinnamoyl, and benzoyl anthranilates in *Saccharomyces cerevisiae*. **PLOS ONE** 10:e0138972
- 15) **Eudes A**, Sathitsuksanoh N, Baidoo EEK, George A, Liang Y, Yang F, Singh S, Keasling JD, Simmons BA, Loqué D (2014) Expression of a bacterial 3-dehydroshikimate dehydratase reduces lignin content and improves biomass saccharification efficiency. **Plant Biotech J** 13:1241-1250
- 14) **Eudes A**, Liang Y, Mitra P, Loqué D (2014) Lignin bioengineering. *Curr Opin Biotechnol* 26:189-198
- 13) **Eudes A**, Juminaga A, Baidoo EE, Collins FW, Keasling JD, Loqué D (2013) Production of hydroxycinnamoyl anthranilates from glucose in *Escherichia coli*. **Microb Cell Fact** 12:62
- 12) **Eudes A**, George A, Mukerjee P, Kim JS, Pollet B, Benke PI, Yang F, Mitra P, Sun L, Cetinkol OP, Chabout S, Mouille G, Soubigou-Taconnat L, Balzergue S, Singh S, Holmes BM, Mukhopadhyay A, Keasling JD, Simmons BA, Lapierre C, Ralph J, Loqué D (2012) Biosynthesis and incorporation of side-chain-truncated lignin monomers to reduce lignin polymerization and enhance saccharification. **Plant Biotech J** 10:609-620
- 11) Loque D, **Eudes A**, Yang F (2011) Biomass availability and sustainability for biofuels, in *Chemical and Biochemical Catalysis for Next Generation Biofuels*. Royal Society of Chemistry. Energy and Environment Series n°4. B. A. Simmons eds. 5-32
- 10) **Eudes A**, Baidoo EE, Yang F, Burd H, Hadi MZ, Collins FW, Keasling JD, Loqué D (2011) Production of tranilast [N-(3',4'-dimethoxycinnamoyl)-anthranilic acid] and its analogs in yeast *Saccharomyces cerevisiae*. **Appl Microbiol Biotechnol** 89:989-1000
- 9) **Eudes A**, Kunji ER, Noirié A, Klaus SM, Vickers TJ, Beverley SM, Gregory JF, Hanson AD (2010) Identification of transport-critical residues in a folate transporter from the folate-biopterin transporter (FBT) family. **J Biol Chem** 285:2867-75
- 8) Rodionov DA, Hebbeln P, **Eudes A**, Ter Beek J, Rodionova IA, Erkens GB, Slotboom DJ, Gelfand MS, Osterman AL, Hanson AD, Eitinger T (2009) A novel class of modular transporters for vitamins in prokaryotes. **J Bacteriol** 191:42-51
- 7) **Eudes A**, Erkens GB, Slotboom DJ, Rodionov DA, Naponelli V, Hanson AD (2008) Identification of Genes encoding the folate- and thiamine-binding membrane proteins in Firmicutes. **J Bacteriol** 190:7591-94
- 6) **Eudes A**, Mouille G, Thévenin J, Goyallon A, Minic Z, Jouanin L (2008) Purification, cloning and functional characterization of an endogenous beta-glucuronidase in *Arabidopsis thaliana*. **Plant Cell Physiol** 49:1331-41
- 5) **Eudes A**, Bozzo GG, Waller JC, Naponelli V, Lim EK, Bowles DJ, Gregory JF 3rd, Hanson AD. (2008) Metabolism of the folate precursor p-aminobenzoate in plants: Glucose ester formation and vacuolar storage. **J Biol Chem** 283:15451-59

- 4) **Eudes A**, Pollet B, Sibout R, Do CT, Séguin A, Lapierre C, Jouanin L (2006) Evidence for a role of AtCAD1 in lignification of elongating stems of *Arabidopsis thaliana*. **Planta** 225:23-39
- 3) Sibout R, **Eudes A**, Mouille G, Pollet B, Lapierre C, Jouanin L, Séguin A (2005) CINNAMYL ALCOHOL DEHYDROGENASE-C and -D are the primary genes involved in lignin biosynthesis in the floral stem of *Arabidopsis*. **Plant Cell** 17:2059-76
- 2) Sibout R, **Eudes A**, Pollet B, Goujon T, Mila I, Granier F, Séguin A, Lapierre C, Jouanin L (2003) Expression pattern of two paralogs encoding cinnamyl alcohol dehydrogenases in *Arabidopsis*. Isolation and characterization of the corresponding mutants. **Plant Physiol** 132:848-60
- 1) Goujon T, Sibout R, **Eudes A**, MacKay J, Jouanin L (2003) Genes involved in the biosynthesis of lignin precursors in *Arabidopsis thaliana*. **Plant Physiol Biochem** 41:677-87

Patents

- 1) US Patent US10358651B2: Loqué D and **Eudes A**: *Modified plants and methods for producing modified lignin by modulating expression of acyltransferases.*
- 2) US Patent US10415052B2: Loqué D and **Eudes A**: *Tissue Specific Reduction of Lignin.*
- 3) US Patent Application 14/232,018: Loqué D and **Eudes A**: *Lignification Reduction in Plants.*
- 4) US Patent US10280441B2: Loqué D and **Eudes A**: *Host Cells and Methods for Producing Cinnamoyl Anthranilate and Analogs Thereof.*
- 5) US Patent Application US20200354736A1: Loqué D and **Eudes A**: *Modified plants and methods for reducing cell wall methylation and recalcitrance*
- 6) US Patent Application 16/796,790: Loqué D, **Eudes A**, Shih PM: *Novel plants and methods for producing muconic acid*

Scientific Presentations

- 05-2021: BEST 2021/21 Biofuture Summit II. Virtual. INVITED SPEAKER
- 04-2021: 43rd Symposium on Biomaterials, Fuels and Chemicals. Virtual. INVITED SPEAKER
- 11-2019: 1st International Lignin Symposium, Sapporo, Japan. INVITED SPEAKER
- 06-2019: Gordon Research Conferences – Plant Metabolic Engineering, Lucca, Italy
- 03-2019: The 2nd International Symposium for Plant Cell Wall Engineering, Tokyo, Japan. INVITED SPEAKER
- 11-2018: 2nd International Conference on Plant Synthetic Biology, Bioengineering, and Biotechnology, Clearwater, FL, USA. INVITED SPEAKER
- 09-2018: Lignobiotech V Symposium, Helsinki, Finland. INVITED SPEAKER
- 08-2018: Gordon Research Conferences – Lignin, Easton, MA, USA
- 07-2017: 6th International Conference on Plant Cell Wall Biology, Dalian, China
- 05-2017: 39th Symposium on Biotechnology for Fuels and Chemicals. San Francisco, CA, USA. INVITED SPEAKER
- 06-2016: Lignobiotech IV Symposium, Madrid, Spain. CO-CHAIRMAN' session
- 07-2015: Gordon Research Conferences – Plant Metabolic Engineering, Waterville Valley, NH, USA INVITED SPEAKER
- 08-2014: Lignin 2014 – Biosynthesis and Utilization, Umeå, Sweden. INVITED SPEAKER
- 07-2013: Gordon Research Conferences – Plant Metabolic Engineering, Waterville Valley, NH, USA
- 10-2012: Lignobiotech II Symposium, Fukuoka, Japan. INVITED SPEAKER
- 03-2011: Keystone Symposium Conference on Biofuels, Singapore
- 07-2010: 12th Plant Cell Wall Meeting, Porto, Portugal
- 07-2009: Synthetic Biology Workshop by the Danish Ministry of Science, Berkeley, California
- 07-2009: ASPB Meeting, Honolulu, HI, USA
- 07-2008: ASPB Meeting, Merida, Mexico
- 07-2007: ASPB Meeting, Chicago, IL, USA

06-2005: Polyphenols and Micronutrients Meeting, Versailles, France. INVITED SPEAKER
09-2005: 4th French Cell Wall Meeting, Rouen, France. INVITED SPEAKER
06-2005: 16th International Conference on Arabidopsis Research, Madison, WI, USA
05-2005: International Workshop on Growing Plants for Increased Nutritional Value, Stavanger, Norway
08-2005: 10th Plant Cell Wall Meeting, Sorrento, Italy. INVITED SPEAKER
07-2004: Plant Polysaccharide Workshop – Satellite meeting of the 22nd International Carbohydrate symposium, York, UK
05-2004: French Molecular Biology of Woody Species Society, Clermont-Ferrand, France. INVITED SPEAKER
11-2003: 2nd French Cell Wall Meeting, Le Croisic, France
07-2003: 5th French Plant Physiology Society Meeting, "Plant Biology and the Challenge of Functional Genomics", Orsay, France.
03-2003: Genoplante Meeting, Poitiers, France

Synergistic Activities

Collaborative work with Afingen Inc., Futuragene, Forage Genetics International, Swetree (Plant biotech companies)

Member of the American Society of Plant Biologists (ASPB)

Reviewer for PNAS, *PLOS ONE*, *Biotechnology for Biofuels*, *Applied Biochemistry and Biotechnology*, *Plant Science*, *Scientific Reports*, *BioEnergy Research*, *Plant Biotechnology Journal*, *Nature Communications*, *Bioresource Technology*, *RSC Advances*, *Planta*, *ACS Sustainable Chemistry & Engineering*, *Frontiers in Plant Science*, *New Phytologist*, *Communications Biology*, *Plants*, *Engineering in Life Sciences*, *Nature Plants*, *Industrial & Engineering Chemistry Research*, *Microbial Cell Factories*, *Environmental Microbiology*, *Green Chemistry*, *Molecules*

Editorial board member of *Plants* (ISSN 2223-7747), Guest Editor for *Metabolites* (ISSN 2218-1989) and *Frontiers in Plant Science* (ISSN 1664-462X)

Member panel for DOE SBIR/STTR FY 2017 Phase II

Member panel for DOE JGI 2017, 2018 semi-annual CSP Synthetic Biology

Member panel for USDA SBIR/STTR FY 2021 Phase II

Honors and Awards

Joint BioEnergy Institute Industry & Entrepreneurial Excellence Award (2019)

Joint BioEnergy Institute Outstanding ROI and Patent Award (2017)

Joint BioEnergy Institute Research Contribution Award (2015)

Joint BioEnergy Institute Inventor Award (2014)

References

Dr. Dominique Loqué

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Prof. Andrew Hanson

University of Florida

Department of

Horticultural Sciences

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Prof. Henrik Scheller

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Lawrence Berkeley

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Prof. Blake A. Simmons

Joint BioEnergy Institute

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