Gerard Sapés de Moreta

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GitHub github.com/gerardsapes
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Website gerardsapes.wixsite.com/plantscience

Development of creative and novel research at the intersection of fundamental and applied plant science. Focus on *connecting plant physiological stress to spectral measurements* to allow *scaling of both plant abiotic and biotic stress and tree mortality to regional levels*. My projects combine classic ecophysiological measurements with hand-held, drone, and plane spectral measurements. Also interested in the development of non-invasive plant stress sensors, high-throughput phenotyping, and remote detection of plant pathogens.

Education

2014 – 2018 **PhD**: Plant ecophysiology. OBEE program of the Division of Biological Sciences. University of Montana.

2012 – 2013 **Masters**: Terrestrial Ecology. Center of Ecological Research and Forestry Applications (CREAF). Autonomous University of Barcelona.

2007 – 2012 **Bachelor of Science**: Biology. Specialized in plant biology and ecology. Autonomous University of Barcelona.

Job Experience

Jul 2025 – Jul 2027 **Junior PI.** CREAF (Autonomous University of Barcelona, Spain)
Reference: jordi.martinez.vilalta@uab.cat (Full professor)

Apr 2025 – Jul 2025 **Postdoctoral associate.** CREAF (Autonomous University of Barcelona, Spain)
Reference: jordi.martinez.vilalta@uab.cat (Full professor)

Jul 2022 – Jan 2025 **Biological scientist III.** Agronomy Department (University of Florida, United States)
Reference: williamhammond@ufl.edu (Assistant professor)

Jan 2022 – Jul 2022 **Postdoctoral associate.** Agronomy Department (University of Florida, United States)
Reference: williamhammond@ufl.edu (Assistant professor)

Jan 2021 – Oct 2023 **Science consultant.** thebluedots agri-tech company (www.thebluedots.io).
Reference: ecabanas2@gmail.com (CEO)

Jan 2019 – Dec 2021 **Postdoctoral associate**. Dep. of Ecology, Evolution, and Behavior (University of Minnesota, United States). Reference: cavender@umn.edu (Full professor)

Jan 2014 – Dec 2018 **PhD student.** OBEE program of the Division of Biological Sciences (University of Montana, United States). Reference: asala@mso.umt.edu (Full professor)

Oct 2013 – Jan 2014 **Research technician.** CREAF (Autonomous University of Barcelona, Spain).
Reference: Francisco.Lloret@uab.cat (Full professor)

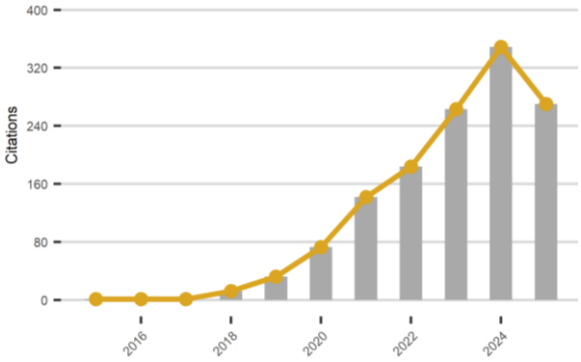
Jun 2012 – Sep 2013 **Master's student.** CREAF (Autonomous University of Barcelona, Spain).
Reference: Francisco.Lloret@uab.cat (Full professor)

Sep 2011 – Jun 2012 **Internship awardee.** CREAF (Autonomous University of Barcelona, Spain).
Reference: Francisco.Lloret@uab.cat (Full professor)

Sep 2010 – Jun 2011 **Technician.** CREAF (Autonomous University of Barcelona, Spain).
Reference: Francisco.Lloret@uab.cat (Full professor)

Publications (h-index: 13, i10-index: 14, citations: 1334)

(asterisk, *, denotes undergraduate mentee)



Potkay A, Cabon A, Peters RL, Fonti P, **Sapes G**, Sala A, Stefanski A, Butler E, Bermudez R, Montgomery R, Reich PB, Feng X. 2025. Generalized stomatal optimization of evolutionary fitness proxies for predicting plant gas exchange under drought, heatwaves, and elevated CO2. Global Change Biology. https://doi.org/10.1111/gcb.70049

Song Y, **Sapes G**, Chang S, Chowdhry R, Mejia T, Hampton A, Kucharski S, Sazzad S, Zhang Y, Tillman B, Resende M, Koppal S, Wilson C, Gerber S, Zare A, Hammond WM. 2024. Plant-soil hydraulic connections as mechanisms of drought tolerance and rapid recovery. Plant, Cell & Environment. https://doi.org/10.1111/pce.15011.

Castillo R, **Sapes G**, Mallen N, John G, Zare A, Hammond WM. 2024. Spectral ecophysiology: hyperspectral pressure–volume curves to estimate leaf turgor loss. New Phytologist. https://doi.org/10.1111/nph.19669.

Sapes G, Schroeder L, Scott A, Clark I, Juzwik J, Montgomery R, Guzman-Q JA, Cavender-Bares J. 2024. Mechanistic links between physiology and spectral reflectance enable pre-visual detection of oak wilt and drought stress. Proceedings of the National Academy of Sciences (PNAS). https://doi.org/10.1073/pnas.2316164121.

McDowell N, **Sapes G**, Pivovaroff A, Adams H, Allen C, Anderegg, Arend M, W, Breshears D, Brodribb T, Choat B, Cochard H, De Caceres-Ainsa M, DeKauwe M, Grossiord C, Hammond W, Hartman H, Hoch G, Kahmen A, Klein T, MacKay S, Mantova M, Martinez-Vilalta J, Medlyn B, Mencuccini M, Nardini A, Olivera R, Sala A, Tissue D, Torres-Ruiz JM, Trowbridge A, Trugman A, Wiley E, Xu C. 2022. A predictive framework for understanding woody plant mortality under drought and warming. Nature Reviews Earth & Environment. https://doi.org/10.1038/s43017-022-00272-1.

Garcia L, **Sapes G**, Cavender-Bares J, Franklin R. Split-ring resonator sensor for detecting water content in biological systems. IEEE. 10.1109/AP-S/USNC-URSI47032.2022.9886976.

Sapes G, Lapadat C, Schweiger A, Juzwik J, Montgomery R, Gholizadeh H, Townsend P, Gamon J, Cavender-Bares J. 2022. Canopy spectral reflectance detects oak wilt at the landscape scale using phylogenetic discrimination. Remote Sensing of Environment. https://doi.org/10.1016/j.rse.2022.112961.

Sapes G, Sala A. 2021. Relative water content consistently predicts drought mortality risk in *Pinus ponderosa* populations with different morphology, physiology, and times to death. Plant, Cell & Environment. https://doi.org/10.1111/pce.14149.

Sapes G, Demaree P*, Lekberg Y, Sala A. 2020. Plant carbohydrate depletion impairs water relations and spreads via ectomycorrhizal networks. New Phytologist. https://doi.org/10.1101/2020.08.03.234823.

Holmlund H, Davis S, Ewers F, Aguirre N, **Sapes G**, Sala A, Pittermann J. 2020. Positive root pressure is critical for whole-plant desiccation recovery in two species of terrestrial resurrection ferns. Journal of Experimental Botany. https://doi.org/10.1093/jxb/erz472.

Sapes G, Roskilly B, Dobrowski S, Maneta M, Anderegg W, Martinez-Vilalta J, Sala A. 2019. Plant water content integrates hydraulics and carbon depletion to predict population-level drought-induced seedling mortality. Tree Physiology. https://doi.org/10.1093/treephys/tpz062.

Martinez-Vilalta J, Anderegg W, **Sapes G**, Sala A. 2019. Greater focus on water pools may improve our ability to understand and anticipate drought-induced mortality in plants. New Phytologist. https://doi.org/10.1111/nph.15644.

Simeone C, Maneta M, Holden Z, **Sapes G,** Sala A, Dobrowski S. 2018. Coupled ecohydrology and plant hydraulics modeling predicts ponderosa pine seedling mortality and lower tree line in the U.S. Northern Rocky Mountains. New Phytologist. https://doi.org/10.1111/nph.15499.

Pérez-Navarro MA, **Sapes G**, Batllori E, Serra-Diaz JM, Esteve MA, Lloret F. 2018. Climatic suitability derived from species distribution models correlates with plant population responses to an extreme drought episode. Ecosystems. https://doi.org/10.1007/s10021-018-0254-0.

Lloret F, **Sapes G,** Rosas T, Galiano L, Saura-Mas S, Sala A, Martínez-Vilalta J. 2018. Non-structural carbohydrates dynamics associated to drought-induced die-off in woody species of a shrubland community. Annals of Botany. https://doi.org/10.1093/aob/mcy039.

Sapes G, Serra-Diaz J, Lloret F. 2017. Species climatic niche explains drought-induced die-off in a Mediterranean woody community. Ecosphere 8 (5):e01833. e0183310.1002/ecs2.1833.

Ryan M, **Sapes G**, Sala A, Hood S. 2015. Tree Physiology and Bark Beetles. New Phytologist. 205 (3), 955-957. Doi: 10.1111/nph.13256.

Publications in Preparation

Sapes G, Goke A, DuPre ME, Keefer E, Sala A, Lekberg Y. When fungal friends turn foes: do ectomycorrhizal networks spread carbon limitation and impair plant water relations in natural stands? In prep.

Sala A, **Sapes G**, Goke A, DuPre ME, Keefer E, Sala A, Lekberg Y. NSC storage impairs osmoregulation but only under carbon limitation: a field experiment In prep.

Clark D*, Vargas G, Menezes-Silva P, Farnese F, **Sapes G**, Chavarria M, Kenworthy K, Hammond W. Accurate calculation of plant thermal limits in high-throughput phenotyping systems. In prep.

Heintzelman C & **Sapes G**, Clark D, Mantova M, Ribera C, Hammond WM. Hot enough to kill: mechanisms of plant survival during extreme hotter-drought stress. In prep.

Castillo-Argaez R, **Sapes G**, Torres L, Alcon N, Heintzelman C, Mantova M, Perry E, Gonzalez A, Bassil E, Correll M, Hammond WM. Efficient and early detection of salinity tolerance: a comparison of classic and high-throughput physiological phenotyping approaches. In prep.

Mantova M, Perry EE, Castillo-Argaez R, Cinquini A, Clark DJ, Cochard H, Heintzelman CJ, Ilinca E, Martin TA, Peter GF, **Sapes G**, Torres EC, Torres-Ruiz J, Hammond WM. Forests of possibility: tree-level variation of functional traits determines time to predicted mortality. In prep.

Grant Proposal Writing Experience

2025 - *The spectral physcape: integrating physiology, remote sensing, and landscape ecology to enable cross-scale predictions of plant stress and death* La Caixa Junior Leader Incoming. **PI: Gerard Sapés**. Submitted: **311,100€**.

2023 - *Heatwave atop unprecedented growing-season maximum temperature: how hot is too hot for agriculture in Florida?* USDA-NIFA. PI: William Hammond. Role: Biological Scientist. Granted: **$293,440**.

2023 - *UF Center for Climate Resilient Plants.* Call for Strategic Funding. PI: William Hammond. Role: Research Scientist. Not Granted: **$1,121,900**.

2023 – *High-throughput physiological and hyperspectral phenotyping of drought-resistance traits to develop aflatoxin resistance, and aflatoxin risk prediction, in southeastern peanuts.* NPRL. PI: William Hammond. Role: **Co-PI**. Granted: **$260,024**.

2022 – *PINEPHYS: Predicting Ideotypes: Novel and Extant from Physiology, Hyperspectral reflectance, and Snp-genotypes*. USDA. PI: William Hammond. Role: **Co-PI**. Granted: **$799,000**.

2022 – *Coffee sustainability: how will ongoing climate change impact plant production and survival?* Melitta. PI: William Hammond. Role: Member of the research team. Granted: **$10,770**.

2021 – *Mycorrhizal networks, plant carbohydrate depletion and vulnerability to drought: an experimental test in the field* (DE-FOA-0002392). DOE. PI: Anna Sala. Role: **Co-PI**. Granted: **$296,784**.

2020 – *Mapping changes in forest diversity and disease in North American temperate forests* (20-BIODIV20-0048). NASA. PI: Jeannine Cavender-Bares. Role: Member of the research team. Granted: **$481,933**

2019 – *Study of tree moisture in oak trees using novel microwave moisture sensors*. Center for Excellence in Sensing Technologies & Analytics (CESTA) Seed Research. PIs: Rhonda Franklin & Jeannine Cavender-Bares. Role: Member of the research team. Granted.

2019 – *Accurate detection of oak wilt at regional scale for effective management*. Minnesota Invasive Terrestrial Plants and Pests Center (MITPPC) Trust Fund. PI: Jeannine Cavender-Bares. Role: Member of the research team. Granted: **$301,993**

2018 – *Key indicators of plant drought-induced mortality risk: from physiology to remote sensing.* MT EPSCoR NASA Research Initiation Grant. PI: Anna Sala. Role: Member of the research team. Granted: **$72,754**.

2016 – *Bioclimatic Niche and Plant Community Dynamics in Response to Climate Change.* Ministerio de Economía y Competitividad (Spain), Programa Nacional de Investigación Fundamental (CGL2015-67419-R). PI: Francisco Lloret. Role: Member of the research team. Granted: **160,000€**.

Awards

2024 – UF Superior Accomplishment Award – Employee Performance (**$300**)
2022 – Plant, Cell, and Environment outstanding student paper award (**$330**)
2020 – Outreach video contributions for *Fungus among us*. Contributors: University of Montana, MPG Ranch, New Phytologist Trust Fund (500 € each, **1,500 €** total)
2019 – ESA Travel Award - Ecological Society of America (**$500**)
2018 – Mountain Climate Conference Exceptional Early Career Invited Speaker (**$400**)
2018 – Multiscale Plant Vascular Biology Travel Award – Gordon Research Conference (**$750**)
2018 – ESA Travel Award - Ecological Society of America (**$500**)
2018 – Best of Grad Con Award – University of Montana
2018 – David Nicholas Memorial Fund – University of Montana (**$500**)
2018 – Jack E. Schmautz Graduate Scholarship – University of Montana (**$2,300**)
2018 – Drollinger-Dial Research Travel Award – University of Montana (**$1,000**)
2017 – IoE Award for outstanding work towards the IoE mission – Institute of Ecosystems (**$5,000**)
2017 – Billings Award for best graduate student talk in the Physiology and Ecology Section of ESA – Ecological Society of America (**$500**)
2017 – ESA Travel Award – Ecological Society of America (**$500**)
2017 – Hydraulics Workshop Assistance and Travel Award – NSF (**$500**)
2017 – Research Creative Scholarship – University of Montana (**$300**)
2017 – David Nicholas Memorial Fund – University of Montana (**$500**)
2017 – Jack E. Schmautz Graduate Scholarship – University of Montana (**$2,200**)
2017 – Best of Grad Con Award – University of Montana
2017 – Collaboration Challenge Research Grant – Interdisciplinary Collaborative Network (**$1,000**)
2016 – IoE Graduate Enhancement Award – Institute of Ecosystems (**$5,000**)
2016 – Phys Fest Travel Award – NSF (**$500**)
2015 – Drollinger-Dial Research Travel Award – University of Montana (**$600**)
2015 – Collaboration Challenge Research Grant – Interdisciplinary Collaborative Network (**$1,000**)
2014 – Jack E. Schmautz Graduate Scholarship – University of Montana (**$700**)
2014 – Drollinger-Dial Research Travel Award – University of Montana (**$500**)
2011 – Ecology Department Collaboration Grant – Universitat Autonoma de Barcelona (**2,400 €**)

Invited Talks, Lectures, and Panels

2024 – Invited conference speaker: *Pre-visual detection of oak wilt and differentiation from drought using spectral reflectance*. – Oak Wilt Managers Meeting, Gaylord, Michigan.
2023 – Invited guest lecture for Field Plot Techniques: *High precision phenotyping systems* – Agronomy Department, University of Florida.
2023 – Invited guest lectures for Agronomy Writing Lunch & Learn Series: *Writing good sentences, paragraphs, and writing efficiently* – Agronomy Department, University of Florida.
2022 – Invited seminar speaker: *Oak Wilt: From physiological mechanisms to predictions across the landscape*. – Department of Pathology, University of Cornell.
2021 – Invited guest lecture for *Forest Monitoring and Conservation* – DAFNE, Università della Tuscia.
2021 – Invited seminar speaker: *The hidden costs of fungi: Unveiling the physiological consequences of fungal parasitism in trees.* – Department of Biology, University of New Mexico.
2021 – Invited guest lecture for *Seedling propagation, artificial regeneration & Drought Resilience* – W.A. Franke College of Forestry and Conservation, University of Montana, Missoula.

2021 – Lab seminar guest: *Plant carbohydrate depletion impairs water relations and spreads via ectomycorrhizal networks* – Weizmann Tree lab, Weizmann Institute of Science, Rehovot, Israel.
2020 – Invited guest lecture for Graduate Student Seminar: *What kills trees?* – Department of Biological Sciences, California State University, Los Angeles.
2020 – Invited Pugsley talk: *From "Why do trees die?" to "Where do trees die?": Connecting fundamental biology with remote sensing* – Department of Forest Resources, University of Minnesota.
2019 – Invited panel speaker in the paper writing/publishing workshop – Department of Forest Resources, University of Minnesota.
2015 – Invited guest lecture for Introduction to Botany: *Root physiology and Development* – Department of Organismal Biology and Ecology, University of Montana.

Conference Presentations (asterisk, *, denotes presenting author)

Mantova M, Castillo-Argaez R, Perry EE, Torres E, Clark D, Cinquini A, Heintzelman C, Cochard H, Martin T, Peter G, **Sapes G**, Torres-Ruiz J, Hammond WM. 2025. Thriving in a hotter and drier world: when physiology and modelling collide to predict the future of Loblolly pine. Xylem International Meeting 6. Oral presentation.

Mantova M, Castillo-Argaez R, Perry EE, Torres E, Clark D, Cinquini A, Heintzelman C, Cochard H, Martin T, Peter G, **Sapes G**, Torres-Ruiz J, Hammond WM. 2024. Pine contains multitude: Intraspecific variation across genotypes in time to growth limitation and mortality risk. Gordon Research Conference in Plant Vascular Biology. Poster.

Sapes G, Torres L, Ichazo C, Amaya H, Gomillion M, Tillman B, Hammond WM. 2024. Canopy spectral signatures predict drought stress in peanuts. National Peanut Festival Research Show. Poster.

Torres L, **Sapes G**, Ichazo C, Gomillion M, Tillman B, Hammond WM. 2024. Key traits determine peanut drought recovery. National Peanut Festival Research Show. Poster.

Perry EE, Mantova M, Castillo-Argaez R, Torres E, Heintzelman C, Clark D, Cochard H, Martin T, Peter G, **Sapes G**, Torres-Ruiz J, Hammond WM. 2024. Parched Pines: Investigating the Climatic-Resilience of Loblolly Pine. Plant Science Symposium University of Florida. Poster.

Heintzelman CJ, Castillo-Argaez R, Mantova M, Perry EE, **Sapes G**, Hammond WM. 2024. Future of coffee: hot drought responses of globally important coffee species. Plant Science Symposium University of Florida. Poster.

Mantova M, Castillo-Argaez R, Perry EE, Torres E, Heintzelman CJ, Clark D, Cochard H, Martin T, Peter G, **Sapes G**, Torres-Ruiz JM, Hammond WM. A Loblolly Pine for Tomorrow: When Genetics, Physiology and Modeling Collide for More Resilient Forests. AGU 2023 Fall Meeting. Oral presentation.

Torres L, **Sapes G**, Ichazo C, Gomillion M, Tillman B, Hammond WM. 2023. Phenotyping Drought Physiology of Peanuts: A Connection with Aflatoxin. United States Peanut Federation. Poster.

Perry EE, Mantova M, Castillo-Argaez R, Torres E, Heintzelman C, Clark D, Cochard H, Martin T, Peter G, **Sapes G**, Torres-Ruiz J, Hammond WM. 2023. How Much Can Pine Trees Sweat? Undergraduate Research Symposium University of Florida. Poster.

Song Y, **Sapes G**, Chang S, Chowdhry R, Mejia T, Hampton A, Kucharski S, Sazzad S, Zhang Y, Koppal S, Zare A, Gerber S, Wilson C, Hammond W. 2023. Plant-soil hydraulic connections as mechanisms of drought tolerance and rapid recovery. ASA, CSSA, SSSA International Annual Meeting. Poster.

Song Y, Castillo R, Noelke R, Hogan S, Chavarria M, **Sapes G**, Kenworthy K, Hammond W. 2023. Bahiagrass genotypes show wide variation in anatomical and physiological traits related to drought tolerance. ASA, CSSA, SSSA International Annual Meeting. Poster.

Heintzelman C, Clark D, Gernica-Diaz C, Pitts J, John G**, Sapes G**, Hammond WM. 2023. Future of coffee: heatwave and drought responses of Coffea arabica and Coffea canephora. ESA meeting. Poster.

Sapes G*, Castillo R, Song Y, Mallen N, Hammond WM. 2023. Don't look up(scale): Peanut spectral reflectance enables sub-organ water mapping across species. ESA meeting. Oral presentation.

Goke A, Kleimann J, **Sapes G**, Lekberg Y, Koide R, Sala A. 2023. Non-structural carbohydrate depletion impairs forest tree water relations in the field. ESA meeting. Oral presentation.

Castillo R, **Sapes G**, Mallen N, John G, Zare A, Hammond WM. 2023. HYPER-PHYS: HYPERspectral Plant HYdration Status. ESA meeting. Oral presentation.

Sapes G*, Schroeder L, Guzman-Q JA, Lapadat C, Clark I, Scott A, Juzwik J, Montgomery R , Cavender-Bares J. 2023. Mechanistic links between physiology and spectra enable pre-visual detection and distinction of Oak Wilt and drought. ESA meeting. Oral presentation.

Torres E, **Sapes G**, Clark D, Hentzelman C, Song Y, Resende M, Hammond W. 2023. Beyond Air Thermal Limits (BATL) Box: a new tool to measure plant thermotolerance. Undergraduate Research Symposium. Poster.

Sapes G*, Díaz S, Clark D, Torres E, Song Y, Chavarria M, Sala A, Hammond W. 2022. Undersaturation artifacts cause severe overestimation of relative water content. Xylem International Conference 5. Poster.

Sapes G*, Schweiger A, Guzmán Q J, Scott A, Clark I, Juzwik J, Montgomery R, Cavender-Bares J. 2022. Previsual spectral detection of vascular damage in *Quercus rubra* caused by oak wilt and drought. Gordon Research Conference: Multiscale Plant Vascular Biology. Poster.

Sapes G*, Lapadat C, Schweiger A, Juzwik J, Montgomery R, Gholizadeh H, Townsend P, Gamon J, Cavender-Bares J. 2021. Canopy spectral reflectance detects oak wilt decline at landscape scale using phylogenetic discrimination. ESA meeting. Oral presentation.

Sapes G*, Lapadat C, Schweiger A, Juzwik J, Montgomery R, Gholizadeh H, Townsend P, Gamon J, Cavender-Bares J. 2020. Canopy spectral reflectance detects oak wilt decline at landscape scale using phylogenetic discrimination. UMISC meeting. Oral presentation.

Sapes G*, Schroeder L, Juzwik J, Montgomery R, Cavender-Bares J. 2020. Spectral reflectance models predict oak wilt and drought physiological decline in red oaks. ESA meeting. Oral presentation.

Sapes G*, Demaree P, Lekberg Y, Sala A. 2019. Depletion of non-structural carbohydrate pools in the absence of drought increases plant vulnerability to drought. ESA meeting. Oral presentation.

Huang C W, Litvak M E, Katul G G, Sevanto S, Anderegg W, Sala A, **Sapes G,** Duman T, Pockman W. 2018. The responses of coordinated xylem-phloem-photosynthetic machinery system to varying environmental conditions. AGU meeting. Oral presentation.

Maneta M, Simeone C, Holden Z, Sala A, **Sapes G**, Dobrowski S. 2018. Drought-induced Ponderosa pine seedling mortality controls the extent of the lower tree line in the U.S. Northern Rocky Mountains. AGU meeting. Poster.

Sapes G*, Simeone C, Demaree P, Roskilly B, Dobrowski S, Maneta M, Holden Z, Lekberg Y, Sala A. 2018. From seedlings to forest distributions: Understanding the importance of water and carbon under drought. Mountain Climate Conference. Oral presentation.

Sapes G*, Demaree P, Lekberg Y, Sala A. 2018. Depletion of non-structural carbohydrate pools in the absence of drought increases plant vulnerability to drought. Gordon Research Conference: Multiscale Plant Vascular Biology. Poster.

Sapes G*, Demaree P, Lekberg Y, Sala A. 2018. **Keynote speaker:** Depletion of non-structural carbohydrate pools in the absence of drought increases plant vulnerability to drought. Gordon Research Conference Seminar: Multiscale Plant Vascular Biology. Oral presentation.

Sapes G*, Roskilly B, Dobrowski S, Maneta M, Sala A. 2018. Plant water content is the best predictor of drought-induced mortality. Reforestation and Stand Improvement Workshop. Oral presentation.

Simeone C, Maneta M, Holden Z, Dobrowski S, **Sapes G**, Sala A. 2017. An examination of drought-induced hydraulic stress in conifer forests using a coupled ecohydrologic model. Montana American Water Resources Associate Conference. Poster.

Sapes G*, Roskilly B, Dobrowski S, Sala A. 2017. Plant Water Content is the Best Predictor of Mortality under Drought. IoE meeting. Poster presentation.

Simeone C, Dobrowski S, Holden Z, **Sapes G**, Sala A, Maneta M. 2017. An Examination of Drought-Induced Hydraulic Stress in Conifer Forests Using a Coupled Ecohydrologic Model. AGU meeting. Oral presentation.

Maneta M, Simeone C, Dobrowski S, Holden Z, **Sapes G**, Sala A, Begueria S. 2017. Insight into the hydraulics and resilience of Ponderosa pine seedlings using a mechanistic ecohydrologic model. AGU meeting. Poster.

Sapes G*, Roskilly B, Dobrowski S, Maneta M, Sala A. 2017. Plant water content is the best predictor of drought-induced mortality. AGU meeting. Oral presentation.

Sapes G*, Roskilly B, Dobrowski S, Sala A. 2017. Plant water content is the best predictor of drought-induced mortality. ESA meeting. Oral presentation.

Sapes G*, Roskilly B, Dobrowski S, Sala A. 2017. Why do plants die under drought? IoE-EPSCoR All-Hands meeting. Oral presentation.

Lloret F, **Sapes G**, Perez M A, Batllori E. 2016. Species climatic niches explain population-level responses in plant communities: the case of drought-induced vegetation die-off. Community ecology for the 21st century: From genes to ecosystems. Oral presentation.

Lloret F, **Sapes G**, Batllori E. 2016. Assessing population-level responses in plant communities affected by drought-induced die-off through species bioclimatic niches. CLIMMANI/INTERFACE workshop. After the extreme: Measuring and modeling impacts on terrestrial ecosystems when thresholds are exceeded. Poster.

Lloret F, **Sapes G**, Perez M A, Batllori E. 2015. Assessing plant community responses to global change through species bioclimatic niches. Ecological European Federation (EEF/SITE) Congress: Ecology at the interface. Oral presentation.

Sapes G*, Serra-Diaz J, Lloret F. 2014. Species bioclimatic niche explains drought-induced die-off in a Mediterranean woody community. Society of American Forestry Symposium. Poster presentation.

Outreach Publications

Sapes G. 2016. La caza como herramienta de protección de la naturaleza. La Vanguardia Natural.

Sapes G. 2016. ¿Cómo y cuánto afectará Trump a los esfuerzos contra el cambio climático? La Vanguardia Natural.

Fellowships

2025 – 2027 Junior PI ERC recruitment fellowship under the Severo Ochoa Award. Center for Ecological Research and Forestry Applications (CREAF).

2014 – 2019 Teaching Assistantship in Organismal Biology and Ecology Department. University of Montana.

2015 – 2016 Research Assistantship in Forestry Department. University of Montana.

Teaching and Mentoring

2023-2024 – Graduate mentoring for Neus Alcon.
2023-2024 – Undergraduate mentoring for Emily Perry.
2023-2024 – Graduate mentoring for Andrew Cinquini.
2023-2024 – Graduate mentoring for Laura Torres.
2023-2024 – Postdoctoral mentoring for Marylou Mantova.
2022-2024 – Graduate mentoring for Cecilia Heller.
2022-2024 – Postdoctoral mentoring for Raiza Castillo.
2022-2024 – Postdoctoral mentoring for Yang Yang Song.
2022-2024 – Graduate mentoring for Shubekshya Shah.
2022-2024 – Graduate mentoring for Medelin Kant.
2022-2024 – Graduate mentoring for Alston Lippert.
2022-2024 – Graduate mentoring for Cross Heintzelman.

2022-2024 – Graduate mentoring for Justin Pitts.
2023 – Undergraduate mentoring for Sofia Gurruchaga.
2023 – Undergraduate mentoring for Hannah Amaya.
2023 – Graduate mentoring for Camila Ichazo.
2022-2023 – Undergraduate mentoring for Dylan Clark.
2022-2023 – Undergraduate mentoring for Eric Torres.
2022 – Undergraduate mentoring for Rebecca Noelke.
2022 – Undergraduate mentoring for Camille Sicangco.
2021 – Supervisor of field technician Isaiah Clark.
2021 – Supervisor of field technician Allison Scott.
2021 – Graduate mentoring for Maria Park.
2020 – Mentor of mentors within the Field Guides Mentor training program.
2019-2021 – Graduate mentoring for Lucy Schroeder.
2019 – Undergraduate mentoring for David Sannerud.
2019 – Undergraduate mentoring for Corina Godoy.
2019 – Undergraduate mentoring for Alejandra Villaseñor Villanueva.
2018 – Undergraduate mentoring for Ella Dartman.
2018 –Teaching assistant for Ecology 371.
2018 – Invited guest lecture for Plant Physiology: *Plant water potentials.*
2018 – Head Teaching assistant for Introduction to Botany 105.
2017 – Teaching assistant for Discovering Biology 101.
2017 – Undergraduate mentoring for Laura Thornton.
2017 – Undergraduate mentoring for Jack Schooley.
2016-2017 – Undergraduate mentoring for Patrick Demaree.
2016 – Undergraduate mentoring for Danica Bornropp.
2015 – Undergraduate mentoring for Auroralela Bayless-Edwards.
2015 – Undergraduate mentoring for Dylan Budke.
2015 – Head Teaching assistant for Introduction to Botany 105.
2014 – Undergraduate mentoring for Introductory Multicultural Summer Undergraduate Research Experience student Adwoa Boahemaa Agyepong.
2014 – Teaching assistant for Principles of Living Systems 160.
2014 – Teaching assistant for Introduction to Botany 105.
2014 – High school mentoring for Alex Blasco.
2014 – High school mentoring for Alex Terrén.
2013 – Undergraduate mentoring for Beatriz Fernandez.
2013 – Undergraduate mentoring for Iris Cobacho.
2013 – Undergraduate mentoring for Isabel Ourêlo.
2012 – Undergraduate mentoring for Laura Guixé.
2012 – Undergraduate mentoring for Belén Cuadra.
2012 – Undergraduate mentoring for Daniel Ponce.

Professional and Departmental Services

Peer reviews since obtention of PhD: 39 papers for 13 journals since 2019: *Global Change Biology* (1), *Remote Sensing of Environment* (3), *American Journal of Botany* (5), *Scientific Reports* (1), *Plant Cell and Environment* (7), *Frontiers in Plant Science* (1), *Annals of Botany PLANTS* (1), *Tree Physiology* (3), *New Phytologist* (10), *Plant Physiology and Biochemistry* (3), *Trees* (2), *Flora* (1), Integrative and Comparative Biology (1).

2020-2022 – **Chair** of the Gordon Research Seminar in Multiscale plant vascular biology.
2020 – Awards judge for the physiological ecology section of the ESA conference.
2019 – Member of the selection committee for the Undergraduate Research Opportunities Program (UROP).
2019-2020 – **Chair** of the Gordon Research Seminar in Multiscale plant vascular biology.
2018 – Graduate student representative in Faculty meetings.
2017-2021 – Member of the Ecological Society of America.
2017-2018 – Member of the American Geophysical Union.
2014-2015 – Member of the Society of American Foresters.

Science Outreach

2021 – Outreach video *Fungus among us.* https://youtu.be/_7YHmNmJ-BE
2018 – Yoncha A, **Sapes G.** Blackfoot Pathways: Sculpture in the Wild – Talking Trees
2018 – Montana Science Fair Judge

2017 – Big Biology: A biology podcast. https://www.bigbiology.org/
2017 – Project Biogames: Bringing science to people through videogames and social networks. https://gerardsapes.wixsite.com/plantscience/outreach
2017 – Montana Science Fair Judge
2017 - Yoncha A, **Sapes G**. Attempting physical contact with geologic time: A collaboration between Arts and Science. UM Grad Con show.
2016 – Montana Science Fair Judge
2016 – SpectrUM Volunteer Program

Workshops

Telling Your Story: Writing a Narrative CV
NSF CABO HIS Spectral Workshop 2020
NCFDD Building a publishing pipeline 2019
NSF Phys-Fest workshop 2016
NSF Tree-line workshop 2015
Effective Teaching and Communication Skills for International Teaching Assistants 2014
Future Forests: Challenges of Mediterranean forests under future climate change 2013

Ecophysiological Skills

Leaf and stem water potential with pressure chamber
Leaf and stem water potential with psychrometers
Osmotic potential
Pressure potential and turgor loss point
Relative water content and volumetric water content (self-developed measurement)
Loss of turgor recovery capacity
Electrolyte leakage
Freeze tolerance
Thermal limits
Pressure-volume curves
Gas exchange and metabolic rates
Stem hydraulic conductivity and root hydraulic conductance
Optic xylem vulnerability method
Non-structural carbohydrate analyses
Isotopic labelling
Morphological and trait measurements
Spectroscopy
Fluorometry (point measurements and spatially explicit rasters)
Lysimetric measurements
Dataloggers and sensors
Soldering
Building skills

GIS Skills

Proficient with both vector and raster
Masking
Mosaicking
Clipping
Spectral subsetting
Image segmentation
Calculator
Raster stacking
Buffer construction
Data extraction
Hyperspectral cubes
Spectral resampling and normalization
Spectral platform transferability
Supervised classification
Application of machine learning based models across raster maps

Statistical Skills

t-test
ANOVA
Mann-Whitney
Wilcoxon test
Chi-square
Simple and multiple linear regression
Generalized linear regression
General linear mixed models
Phylogenetic least-square regression
Orthogonal regression
Segmented regression
PCA
Residual analyses
Bootstrapping
Quantile and Kennard-Stone even sampling algorithms
Species distribution and niche modeling
Machine learning
Partial least-square regression
Partial least-square discriminant analysis
Random forests
Wavelet analyses
Derivative analyses
Difference in differences
Flexible statistical thinking framework

Relevant Coding Skills

Development of analytical pipelines to easily couple hyperspectral, data-dense datasets with physiological datasets, build predictive models, and apply them across spatially explicit images.

Development of high efficiency data processing and analytical pipelines to enable high throughput physiological phenotyping via an array of 138 lysimeters that input data every 3 minutes.

Development of personal graphic libraries that generate publication-ready graphs with invaded statistics and allow real-time assessment of ongoing experiments.

Development of an interface to parallelly run three flow sensors for hydraulic conductivity measurements. The interface eliminates human error by identifying when flow is stable based on user-defined threshold values and automatically calculates flow. Code was made publicly available in Sapes et al. (2019).

Experience with big data, parallel processing, and use of supercomputers.

Proficient with Git Workflow.

High capacity to resolve unknown or unexpected coding issues.

Software Skills

R for Statistical Computing
Python
SPSS
Statistica
MiraMon (GIS)
Quantum GIS
ENVI
ArcGIS
MaxEnt (Species Distribution Modeling)
Adobe Illustrator
ImageJ
Windows 98/Me/2000/Xp/Vista/7/8/10/11

Proficiency in Microsoft Office
REAPER – Digital Audio Workstation

Languages

Spanish: Native
Catalan: Native
English: Naturalized. Lived 11 years in USA.

Other Work Experience

September 2005 to June 2012.
Electric guitar teacher at IES Puig de la Creu (Castellar del Vallès, Spain).