Roberto A. Ribas Zunino

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Available to start immediately; open to relocation

Education

- **Master of Science** *May 2023 – Present*
  Microbiology and Cell Science, University of Florida (online)
  Concentration: Medical Microbiology and Biochemistry
- **Bachelor of Science** *Aug 2020 – Dec 2022*
  Microbiology and Cell Science, University of Florida
  Certificate in AI Fundamentals and Applications
- **Associate of Arts** *Aug 2018 – Aug 2020*
  Biological Sciences, Santa Fe College
  Graduated with Distinction

Bench and In Vivo Skills

In vivo (mouse): intraperitoneal, tail-vein and oral gavage dosing; blood collection; dissection and tissue harvest; behavioral testing; viral-vector lung tumor induction in genetically engineered mice; helped maintain breeding colonies (breeder setup, weaning, Transnetyx genotyping)
Tissue: cryosectioning of fresh-frozen samples; MALDI imaging of fresh-frozen and FFPE tissue samples; immunohistochemistry; immunofluorescence
Lab operations: operated and maintained the Bruker timsTOF fleX, coordinating service visits with Bruker and HTX; purchasing and spend tracking; vendor quotes; service contracts; material transfer agreements; sample tracking (6,000+ samples) and shipping

Research Experience

- **Sun, Gentry, and Vander Kooi Laboratories** *Feb 2023 – Mar 2026*
  Department of Biochemistry and Molecular Biology, University of Florida College of Medicine
  Mentors: Drs. Ramon C. Sun, Matthew S. Gentry, and Craig W. Vander Kooi

  Laboratory Technician (Feb 2023 – Mar 2026); *Lead Center Scientist and Team Lead*, Center for Advanced Spatial Biomolecule Research (CASBR) (Jul 2023 – Mar 2026); *Research Assistant* (Aug 2025 – Mar 2026)

  – Studied metabolism across multiple diseases using MALDI TIMS-TOF mass spectrometry imaging, performing spatial metabolomics, lipidomics, and glycomics assays.
  – First author on methods establishing mass spectrometry imaging of the cochlea (*J Am Soc Mass Spectrom*) and spatial imaging of the glycome (*J Vis Exp*); co-first author on MetaVision3D, an AI-driven framework that maps the brain metabolome in three dimensions (*Nat Metab*).
  – Developed Vision, an all-in-one platform that combines Sami (Spatial Augmented Multiomics Interface; *Nat Commun*) and MetaVision3D (*Nat Metab*) for analysis, visualization, and spatial UMAP clustering of high-dimensional spatial omics data.

- Coordinated spatial biology and molecular profiling workflows across 250+ CASBR research projects and developed 10+ standardized laboratory protocols; led and mentored a team of 8 researchers, driving experimental design, data reproducibility, and integration of multiomics workflows.
- Generated spatial multiomics data for collaborative studies in cancer, neurodegeneration, and rare metabolic disease with groups around the world, contributing to 19 publications and preprints.

- **Dias Laboratory** *Apr 2022 – Sep 2023*
  Department of Microbiology and Cell Science, University of Florida College of Agricultural and Life Sciences
  Mentor: Dr. Raquel Dias
  Undergraduate Researcher
  - Applied AI models to integrate host–microbe omics data for disease prediction and biomedical research.

Publications

14 peer-reviewed publications (3 first or co-first author) · 1 accepted (*Nat Neurosci*) · 4 preprints

First and Co-First Author Publications

- **Ribas RA**, Tang Q, Caffee SI, Shedlock CJ, Hawkinson TR, Dragich AK, Ziani BEC, Bucco Paolasso F, Black AP, Ma X, Kota HC, Chen L, Frolenkov GI, Allison DB, Gentry MS, Sun RC, Vander Kooi CW. Mass spectrometry-based spatial imaging of the cochlea. J Am Soc Mass Spectrom. 2026 May 6;37(5):1187–95. doi:10.1021/jasms.5c00436.
- **Ribas RA**, Paolasso FB, Ryan AM, Sanchez MR, Soto CM, Caffee SI, Larson RC, Allison DB, Gentry MS, Sun RC, Vander Kooi CW. Spatial molecular imaging of the glycome using mass spectrometry. J Vis Exp. 2025 Nov 28;(225):e69154. doi:10.3791/69154.
- Ma X*, Shedlock CJ*, Medina T*, **Ribas RA***, Clarke HA, Hawkinson TR, Dande PK, Golamari HKR, Wu L, Ziani BE, Burke SN, Merritt ME, Vander Kooi CW, Gentry MS, Yadav NN, Chen L, Sun RC. AI-driven framework to map the brain metabolome in three dimensions. Nat Metab. 2025 Apr;7(4):842–53. doi:10.1038/s42255-025-01242-9.

*Equal contribution (co-first authors)

Peer-Reviewed Publications

- Kumar P, Merquiol E, Avraham T, Sinai-Turyanski R, Singh PK, **Ribas RA**, Sweetat S, Sprecher U, Muchtar N, Gupta M, Mishra K, Ojha SK, Yekhtin Z, Glickstein H, Shalev O, Eliassaf A, Morshina A, Segev-Yekutiel H, Garti S, Garti N, Rosenmann H, Weil M, Gentry MS, Blum G, Kakhlon O. Autolysosomal enhancer GHF201 attenuates pathophysiology in a mucopolysaccharidosis type I mouse model. Life Sci Alliance. 2026 Oct 7;9(12):e202603750. doi:10.26508/lsa.202603750.
- Hawkinson TR, Liu Z, **Ribas RA**, Medina T, Nielsen RS, Clarke HA, Ma X, Mueller AC, Plasencia AF, Sheer AL, Simpson ST, Soto CM, Sudderth J, Cai F, Cantrell AR, Colpaert

MG, Shedlock CJ, Wu L, Young LEA, Kooser DD, Chen L, Ryan AM, Quinones S, Son J, Azadi P, DeBerardinis RJ, Prokop S, Allison D, Yang S, Chen H, Huang Y, He X, Alonge KM, Guo J, Guo Y, Bian J, Vander Kooi CW, Gentry MS, Sun RC. Hyperglycosylation is a metabolic driver of Alzheimer's disease. Nat Metab. 2026 Jun;8(6):1410–25. doi:10.1038/s42255-026-01538-4.

- Fusco AF, Rana S, Macintyre MM, Gonzalez IA, **Ribas RA**, Sun RC, Fuller DD. Acute administration of ampakine CX1739 after cervical spinal cord injury. J Neurotrauma. 2026 May;43(9–10):715–31. doi:10.1177/08977151251382939.

- Bernardi F, Torrejon J, Basili I, Van Ommeren R, Marsaud V, Yu H, Talbot J, Souphron J, Indersie E, Forget A, Bonneau B, Massiot A, Alcazar C, Figeac L, Bonerandi E, Cancila G, Sirbu O, Yadav N, Mohanakrishnan D, Lombard B, Loew D, Poullet P, Liva S, Lovino M, Lin IH, Nakashima T, Gharsalli T, Nicolas PA, Yubuki N, **Ribas RA**, Colsch B, Chu-Van E, Castelli F, Sampaio JL, Leboucher S, Lasgi C, Besse L, Soler MN, Lo Re V, Planque N, Abeysundara N, Balin P, Wang H, Su H, Wu X, Cavalli FMG, Saulnier O, Ficarra E, Di Marcotullio L, Kumegawa K, Maruyama R, Kawauchi D, Picard D, Remke M, Riffaud L, Puiseux C, Bouchoucha Y, Huybrechts S, Simbozel M, Bourdeaut F, Varlet P, Puget S, Blauwblomme T, Andrianteranagna M, Planchon JM, Dugourd A, Saez-Rodriguez J, Barillot E, Servant N, Martignetti L, Rich J, Kool M, Pfister SM, Agnihotri S, Suzuki H, Fanjul M, Wang WJ, Tsai JW, Sun RC, Beccaria K, Dufour C, Sarry JE, Michealraj KA, Taylor MD, Ayrault O. Multiomic integration reveals tumoral heterogeneity of lipid dependence within lethal group 3 medulloblastoma. Cancer Cell. 2026 Feb 9;44(2):383–404.e18. doi:10.1016/j.ccell.2025.12.012.

- Fuller DD, Rana S, Thakre PP, Benevides ES, Pope MK, Todd AG, Jensen VN, Vaught L, Cloutier DA, **Ribas RA**, Larson RC, Gentry MS, Sun RC, Chandran V, Corti M, Falk DJ, Byrne BJ. Neonatal systemic gene therapy restores cardiorespiratory function in a rat model of Pompe disease. Mol Ther. 2025 Sep 3;33(9):4276–89. doi:10.1016/j.ymthe.2025.06.022.

- Rafikov R, Thompson DM, Rafikova O, Camp SM, **Ribas RA**, Sun RC, Gentry MS, Casanova NG, Garcia JGN. Predictive modeling of ARDS mortality integrating biomarker/cytokine, clinical and metabolomic data. Transl Res. 2025 Jul;281:31–42. doi:10.1016/j.trsl.2025.05.005.

- Cantrell AR, Hawkinson TR, Juras JA, Webb MB, Medina T, **Ribas RA**, Collins J, Bunnell AA, Young LEA, Markussen KH, Andres DA, Long JR, Vander Kooi CW, Smith BN, Sun RC, Gentry MS. Protocol for high-power, brain-focused microwave fixation to define rodent metabolism. STAR Protoc. 2025 Jun 20;6(2):103794. doi:10.1016/j.xpro.2025.103794.

- Clarke HA, Ma X, Shedlock CJ, Medina T, Hawkinson TR, Wu L, **Ribas RA**, Keohane S, Ravi S, Bizon JL, Burke SN, Abisambra JF, Merritt ME, Prentice BM, Vander Kooi CW, Gentry MS, Chen L, Sun RC. Spatial mapping of the brain metabolome lipidome and glycome. Nat Commun. 2025 May 12;16(1):4373. doi:10.1038/s41467-025-59487-7.

- Clarke HA, Hawkinson TR, Shedlock CJ, Medina T, **Ribas RA**, Wu L, Liu Z, Ma X, Xia Y, Huang Y, He X, Chang JE, Young LEA, Juras JA, Buoncristiani MD, James AN, Rushin A, Merritt ME, Mestas A, Lamb JF, Manauis EC, Austin GL, Chen L, Singh PK, Bian J, Vander Kooi CW, Evers BM, Brainson CF, Allison DB, Gentry MS, Sun RC. Glycogen drives tumour initiation and progression in lung adenocarcinoma. Nat Metab. 2025 May;7(5):952–65. doi:10.1038/s42255-025-01243-8.

- Zhu B, Pitts MG, Buoncristiani MD, Bryant LT, Lopez-Nunez O, Gurria JP, Shedlock C, **Ribas RA**, Keohane S, Liu J, Wang C, Gentry MS, Shelman NR, Allison DB, Evers BM, Sun RC, Rellinger EJ. GDP-mannose 4,6-dehydratase is a key driver of MYCN-amplified neuroblastoma core fucosylation and tumorigenesis. Oncogene. 2025 May;44(18):1272–83. doi:10.1038/s41388-025-03297-0.

- Liu Y, Kwok W, Yoon H, Ryu JC, Stevens P, Hawkinson TR, Shedlock CJ, **Ribas RA**, Medina T, Keohane SB, Scharre D, Bruschweiler-Li L, Bruschweiler R, Gaultier A, Obrietan K, Sun RC, Yoon SO. Imbalance in glucose metabolism regulates the transition of microglia from homeostasis to disease-associated microglia stage 1. J Neurosci. 2024 May 15;44(20):e1563232024. doi:10.1523/JNEUROSCI.1563-23.2024.

Accepted Manuscripts

- Quiñones S, Saha S, Wang JC, Kim E, Bottom-Tanzer S, Armbruster M, Macêdo JKA, Hawkinson T, **Ribas RA**, Ziani BEC, Ryan A, Singh PK, Wu L, Cantrell AR, Blackman J, Swindell R, Kumar P, George J, Tai A, Whalen M, McConnell MJ, Gentry MS, Sun RC, Dulla CG. A transcriptional and metabolic framework underlying parvalbumin interneuron dysfunction after traumatic brain injury. Nat Neurosci. Accepted, in press. Earlier version on bioRxiv: doi:10.1101/2024.06.19.599637.

Preprints

- Clarke HA, Shedlock CJ, Peters H, Hawkinson TR, Kooser DD, Janzen O, Varma A, Bucco F, Soto CM, Larson R, Ryan AM, Medina T, **Ribas RA**, Calulot CM, Wu L, Russ J, Florea S, Wang Y, Basso KB, Allison DB, Corti M, Fuller DD, Alilain WJ, Mitchell GS, Byrne BJ, Vander Kooi CW, Guo Y, Gentry MS, Sun RC. Systemic hypoxia drives glycogen-fueled progression of lung adenocarcinoma. bioRxiv [Preprint]. 2026 Sep 3. doi:10.64898/2026.09.01.748693.

- Liang R, Cai L, Nguyen PT, Kelekar S, Cervantes MB, Tippetts T, Chen E, **Ribas RA**, Ryan A, Chou J, Sun R, Zhu H, DeBerardinis RJ. The liver compensates for zonal loss of glucose 6-phosphatase to prevent glycogen storage disease. bioRxiv [Preprint]. 2026 Jul 28. doi:10.64898/2026.07.26.740786.

- Liu Z, Ma X, **Ribas RA**, Medina T, Quinones S, Son J, Wu L, Ryan AM, Shedlock C, Ziani B, Barco-Caiaffa V, Rao N, Wong K, Titus A, Larson R, Vander Kooi CW, Chandel NS, Gentry MS, Chen L, Sun RC. Metabolic coherence of the mouse brain. bioRxiv [Preprint]. 2026 May 9. doi:10.64898/2026.05.07.723592.

- Okada J, Landgraf A, Horton M, Qiu Y, Xiaoli AM, **Ribas RA**, Liu L, Krylova SV, Olivos HJ, Schuster VL, Yang F, Saito T, Sun RC, Hawkins M, Schwartz GJ, Eliscovich C, Shinoda K, Kurland IJ, Pessin JE. A novel subset of hepatocytes is simultaneously gluconeogenic and de novo lipogenic in the fed state and is naturally insulin resistant. bioRxiv [Preprint]. 2026 Mar 16. doi:10.64898/2026.03.09.710526.

Poster Presentations

- *Redefining Brain Metabolomics Through High-Resolution Spatial Imaging*
  Winter Conference on Brain Research (Winter Brain), Lake Tahoe, CA *Jan 2025*

- *MetaVision3D: Unlocking 3D Metabolic Complexity with AI Across Mouse Models*
  UF College of Medicine Celebration of Research (Research Day), Gainesville, FL *Feb 2025*
- *MetaVision3D: Revolutionizing Metabolome Research with Cutting-Edge 3D Spatial Atlases*
  UF College of Medicine Celebration of Research (Research Day), Gainesville, FL *Feb 2024*

Technical Documentation and Protocols

- **HTX Imaging**, Application Note 69 *Jan 2026*
  Sublimation and Recrystallization of NEDC Matrix for Metabolite and Lipid Imaging. Data courtesy of Dr. Craig Vander Kooi, Dr. Ramon Sun, Dr. Tara Hawkinson, **Roberto A. Ribas**, Isabella Caffee, and Terrymar Medina.

Technical Skills

Spatial and analytical: MALDI TIMS-TOF mass spectrometry imaging (metabolites, lipids, glycogen, N-glycans); HPLC; matrix sublimation; 3D spatial reconstruction
Molecular and cell biology: mammalian cell culture; aseptic technique; microbial culture, Gram staining, and identification (VITEK 2); cell counting and viability assays; histopathological staining
Models and specimens: mouse colony support (breeding, weaning, genotyping); rodent models; microwave fixation of rodent brain; human tissue specimens; BSL-2 organisms
Computational: Python, R, Power BI, GraphPad Prism, Excel; machine learning for multiomics integration
Quality and compliance: cGMP, SOP development, environmental monitoring
Languages: English and Spanish (bilingual)

Industry and Clinical Experience

- **Quality Control Microbiologist I** *Apr 2026 – May 2026*
  Vivex Biologics, Miami, FL
  Performed cGMP microbiological testing, environmental monitoring, and VITEK 2 identification to ensure raw material and finished product compliance with regulatory specifications.
- **Personal Care Assistant** *May 2022 – Oct 2023*
  UF Health Unit 67 (Cardiovascular/Lung Transplant)
  Supported patient hygiene, mobility, vital signs, and records in a transplant care setting.

Teaching, Leadership, and Outreach

- **Undergraduate Teaching Assistant**, University of Florida *Nov 2020 – Dec 2022*
  Courses: MCB3023L (Spring 2021, Fall 2022), MCB2000L (Summer 2022)
- **Mathematics and Science Tutor**, GoStudent (Remote) *Mar 2022 – Mar 2023*
- **Co-Director**, UF Global Health Case Competition *Sep 2022 – May 2024*
  Executive Board: Co-Director (2023–2024), Case Writer (2022–2023); Participant (2021–2022)
- **Panelist**, UF COM Department of Biochemistry and Molecular Biology *May 2024*
  Daytona State College visit: *Academic Life After State College*, a panel for students beginning their academic journey at a state or community college