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Education (year, degree, area, institution)

2009	BS	Biology	The University of North Carolina at Asheville (UNCA), Asheville, NC
2012	MS	Biochemistry	North Carolina State University (NS State), Raleigh, NC
2016	PhD	Chemistry and Chemical Biology	Northeastern University (NEU), Boston, MA

Postdoctoral Training (dates, position, mentor, institution)

1/2016-4/2020	Research Fellow	Medicine, Cancer Genetics (Kevin M. Haigis)	Beth Israel Deaconess Medical Center (BIDMC), Boston, MA
1/2016-present	Research Fellow	Medicine (Kevin M. Haigis)	Harvard Medical School (HMS), Boston, MA
7/2017-12/2020	American Cancer Society Postdoctoral Fellow	Cancer Biology	BIDMC, HMS and Dana-Farber Cancer Institute (DFCI), Boston, MA
4/2020-present	Research Fellow	Cancer Biology (Kevin M. Haigis)	DFCI, Boston, MA

Faculty Academic Appointments (dates, position, mentor, institution)

8/2016-12/2016	Head Teaching Fellow	Chemistry, Principles of Organic Chemistry	Harvard University, Cambridge, MA

Other Professional Positions (dates, position, institution)

2016-2019	Visiting Scientist (Consultant)	Northeastern University

Professional Societies and Service (dates, position, role)

2016-present	American Society for Biochemistry and Molecular Biology (ASBMB)	Member
2017-present	American Association for Cancer Research (AACR)	Associate Member
2021	American Society for Biochemistry and Molecular Biology (ASBMB)	Undergraduate Poster Judge

Ad hoc Reviewer

Biochemistry
Cancer Discovery
Cell Reports
The EMBO Journal
Journal of Biological Chemistry
Journal Experimental Medicine
Molecular Carcinogenesis
Nature Communications
Nature Letters
Proceedings for the National Academy of Sciences
Scientific Reports

Honors, Prizes, and Professional Development awards (date, award, institution)

2009	Undergraduate Research Award	UNCA
2009	Distinction in Biology	UNCA
2016	Scholarship to 21st Century Mouse Genetics	Jackson Laboratories
2022	Translational Cancer Research for Basic Scientists	AACR
2024	Scholar-In-Training award AACR Annual Meeting	AACR

Funding Information (dates and status, award)

2017-2020
Funded

Title: Regulation of KRas Oncogenicity by Phosphorylation
Source: American Cancer Society, Award number: PF-17-066-01-TBG
Role: PI
Summary: Determine how K-Ras cis-phosphorylation promotes cell transformation. Generate at characterize mouse models of colorectal cancer expressing K-Ras^{A59T} and K-Ras^{A59E}.

Teaching Experience (year, role, commitment)

North Carolina State University

2011	Introductory Biochemistry Laboratory Undergraduate students	Molecular and Structural Biochemistry One 4-hr session per week for 15 wks

Northeastern University

2014-2015	General Chemistry for Engineers Undergraduate students	Northeastern Chemistry and Chemical Biology 2-hr session per week for 15 wks
2015	General Chemistry Laboratory Undergraduate students	Northeastern Chemistry and Chemical Biology One 4-hr session per week for 15 wks

Harvard University

2016	Introductory Organic Chemistry Undergraduate students	Harvard University, Chemistry 3-hr per week for 15 wks

Laboratory Training Responsibilities (years, description, institution, commitment)

2012-2016	Supervision and Training Undergraduate mentees	Northeastern University	Daily mentorship
2016-2020	Supervision and Training Technicians, Undergraduate and Graduate mentees	BIDMC	Daily mentorship
2020-2021	Supervision and Training High School mentee	DFCI	2hr per wk over 5 months
2020-	Supervision and Training Technicians and Graduate students	DFCI	Daily mentorship

Mentorship (years, individual and stage mentored, institution, role in their training)

2013-2015	Austin Hendricks, Undergraduate	Northeastern University	Conducted research in the Mattos lab. I trained them in protein chemistry techniques.
2015	Jose Rodriguez, Undergraduate	Northeastern University	Conducted research in the Mattos lab. I trained them in protein chemistry techniques. Their work is in preparation for a manuscript.

2014-2015	Patrick Donohue, Undergraduate	Northeastern University	Conducted research in the Mattos lab. I trained them in basic laboratory techniques.
2015	Shores Salter, Undergraduate	Northeastern University	Conducted research in the Mattos lab. I trained them in protein chemistry techniques. They co-authored one manuscript.
2015-2016	Derion Reid, Graduate	Northeastern University	Conducted graduate research in the Mattos lab. I trained them in protein chemistry techniques. Graduated with a PhD and co-authored two manuscripts.
2014-2016	Ryan Knihtila, Graduate	Northeastern University	Conducted research in the Mattos lab. I trained them in protein chemistry techniques. Graduated with a PhD and co-authored two manuscripts.
2014-2016	Jillian Parker, Graduate	Northeastern University	Conducted research in the Mattos lab. I trained them in basic laboratory techniques. Graduated with a PhD and co-authored two manuscripts.
2014-2016	Kendra Marcus, Graduate	Northeastern University	Conducted research in the Mattos lab. I trained them in protein chemistry techniques. Graduated with a PhD and their work is in preparation for a manuscript.
2016-2017	Rebecca DeStafanis, Lab Technician	BIDMC/HMS	Conducted research in the Haigis lab. I trained them in basic laboratory techniques.
2017	Kimberly Hagel, Graduate	BIDMC/HMS	Rotated in the Haigis lab. I trained them in protein enzymology techniques.
2017	Sophia Liu, High School	BIDMC/HMS	Conducted research in the Haigis lab. I trained them in basic laboratory techniques.
2018	Kevin Dervishi, Graduate	BIDMC/HMS	Rotated in the Haigis lab. I trained them in in-cell western techniques.
2018-2020	Andrea Liu, High School	BIDMC/HMS DFCI/HMS	Conducted summer internships in the Haigis lab. I trained them in protein binding assays and oversaw their literature review. They co-authored one manuscript.
2020-2022	Shannon Hull, Lab Technician	DFCI/HMS	Conducted research in the Haigis lab. I trained them in protein chemistry techniques, including molecular dynamics simulations. Their work is in preparation for a manuscript.
2022- present	Amanda May, Graduate	DFCI/HMS	Conducting research in the Haigis lab. Training them in protein enzymology and assay design.
2023- present	Eve O'Donoghue	DFCI/HMS	Conducted research in the Haigis lab.

I trained them in general wet lab techniques, mouse husbandry and phenotyping, protein assays.

Invited Presentations (local) as First Author (year, inviter, location)

2014	Greater Boston Crystallography Group (GBCB), Massachusetts Institute of Technology, Cambridge, MA
2017	Chemistry and Chemical Biology Department, Northeastern University, Boston, MA
2018	The Colrain Meeting, Colrain, MA
2019	Cancer Signaling meeting, Beth Israel Deaconess Medical Center, Boston, MA
2020	Cancer Signaling meeting, Beth Israel Deaconess Medical Center, Boston, MA
2022	Cancer Biology Retreat, University of Massachusetts, Boston, MA
2022	Cancer Signaling meeting, Beth Israel Deaconess Medical Center, Boston, MA
2022	Department of Oncology Science, The University of Oklahoma, Oklahoma City, OK
2022	Department of Biochemistry and Molecular Biology, Drexel University College of Medicine, Philadelphia, PA
2022	The Department of Pharmacology and Toxicology, Medical College of Wisconsin, Milwaukee, WI
2023	Cancer Signaling meeting, Beth Israel Deaconess Medical Center, Boston, MA
2024	The Department of Molecular and Biomedical Sciences, The University of Maine, Orono, ME
2024	The Department of Chemistry and Biochemistry, University of South Carolina, Columbia, SC

Oral Conference Presentations as First Author (year, title/meeting)

2021	Regulation of RAS Function by Active Site Autophosphorylation American Society for Biochemistry and Molecular Biology National Meeting, Rockville MD
2021	Characterization of Oncogenic KRAS A59 Alleles and their Cooperation with the MAPK Signaling Pathway American Association for Cancer Research National Meeting, Philadelphia, PA
2024	Ala59 Mutants of KRAS Cooperate with Nf1 Loss to Enhance Colon Tumorigenesis American Association for Cancer Research National Meeting, San Diego, CA

Peer-reviewed Publications in Print or Other Media [ORCID ID: 0000-0002-6521-3803]

1. Kearney BM, **Johnson CW**, Roberts DM, Swartz P, Mattos C. DRoP: a water analysis program identifies Ras-GTP-specific pathway of communication between membrane-interacting regions and the active site. J Mol Biol. 2014 Feb 6;426(3):611-29. doi: 10.1016/j.jmb.2013.10.036. Epub 2013 Nov 2. PMID: 24189050.

2. Ting PY, **Johnson CW**, Fang C, Cao X, Graeber TG, Mattos C, Colicelli J. Tyrosine phosphorylation of RAS by ABL allosterically enhances effector binding. FASEB J. 2015 Sep;29(9):3750-61. doi: 10.1096/fj.15-271510. Epub 2015 May 21. PMID: 25999467; PMCID: PMC4550377.

3. **Johnson CW**, Buhrman G, Ting PY, Colicelli J, Mattos C. Expression, purification, crystallization and X-ray data collection for RAS and its mutants. Data Brief. 2015 Dec 17;6:423-7. doi: 10.1016/j.dib.2015.12.007. PMID: 26866052; PMCID: PMC4710794.

4. **Johnson CW***, Reid D*, Parker JA, Salter S, Knihtila R, Kuzmic P, Mattos C. The small GTPases K-Ras, N-Ras, and H-Ras have distinct biochemical properties determined by allosteric effects. J Biol Chem. 2017 Aug 4;292(31):12981-12993. doi: 10.1074/jbc.M117.778886. Epub 2017 Jun 19. PMID: 28630043; PMCID: PMC5546037. ***(Selected for reprint in a special virtual issue: Cancer: https://www.jbc.org/cancer).***

5. **Johnson CW***, Lin YJ*, Reid D, Parker J, Pavlopoulos S, Dischinger P, Graveel C, Aguirre AJ, Steensma M, Haigis KM, Mattos C. Isoform-Specific Destabilization of the Active Site Reveals a Molecular Mechanism of Intrinsic Activation of KRas G13D. Cell Rep. 2019 Aug 6;28(6):1538-1550.e7. doi: 10.1016/j.celrep.2019.07.026. PMID: 31390567; PMCID: PMC6709685.

6. Poulin EJ, Bera AK, Lu J, Lin YJ, Strasser SD, Paulo JA, Huang TQ, Morales C, Yan W, Cook J, Nowak JA, Brubaker DK, Joughin BA, **Johnson CW**, DeStefanis RA, Ghazi PC, Gondi S, Wales TE, Iacob RE, Bogdanova L, Gierut JJ, Li Y, Engen JR, Perez-Mancera PA, Braun BS, Gygi SP, Lauffenburger DA, Westover KD, Haigis KM. Tissue-Specific Oncogenic Activity of KRASA146T. Cancer Discov. 2019 Jun;9(6):738-755. doi: 10.1158/2159-8290.CD-18-1220. Epub 2019 Apr 5. PMID: 30952657; PMCID: PMC6548671.

7. **Johnson CW**, Seo H-S, Terrell EM, Yang M-H, KleinJan F, Gebregiworgis T, Gasmi-Seabrook GMC, Geffken EA, Lakhani J, Song K, Bashyal P, Popow O, Paulo JA, Liu A, Mattos C, Marshall CB, Ikura M, Morrison DK, Dhe-Paganon S, Haigis KM, Regulation of GTPase function by autophosphorylation. Mol Cell. 2022 Mar 3;82(5):950-968.e14. doi: 10.1016/j.molcel.2022.02.011. Epub 2022 Feb 23. PMID: 35202574; PMCID: PMC8986090.

8. Yang MH, Tran TH, Hunt B, Agnor R, **Johnson CW**, Shui B, Waybright TJ, Nowak JA, Stephen AG, Simanshu DK, Haigis KM. Allosteric regulation of switch-II domain controls KRAS oncogenicity. Cancer Res. 2023 Aug 9:CAN-22-3210. doi: 10.1158/0008-5472.CAN-22-3210. Epub ahead of print. PMID: 37556505.

9. **Johnson CW**, Fetics SK, Davis KP, Rodrigues JA, Mattos C. Allosteric site variants affect GTP hydrolysis on Ras. Protein Sci. 2023 Aug 24:e4767. doi: 10.1002/pro.4767. Epub ahead of print. PMID: 37615343.

Reviews, Chapters, Monographs and Editorials

10. **Johnson CW**, Mattos C. The allosteric switch and conformational states in Ras GTPase affected by small molecules. Enzymes. 2013;33 Pt A:41-67. doi: 10.1016/B978-0-12-416749-0.00003-8. Epub 2013 Aug 8. PMID: 25033800.

11. **Johnson CW***, Burkhart DL*, Haigis KM, Classification of K-RAS activating mutations and the implications for therapeutic intervention. Cancer Discov. 2022 Apr 1;12(4):913-923. doi: 10.1158/2159-8290.CD-22-0035. PMID: 35373279; PMCID: PMC8988514.

12. **Johnson CW**, Haigis KM. All Roads Lead to Rome: YAP/TAZ Activity Influences Efficacy of KRASG12C Inhibitors. Cancer Res. 2023 Dec 15;83(24):4005-4007. doi: 10.1158/0008-5472.CAN-23-3547. PMID: 38098448.

Articles in preparation or in review

12. Schneider JL, Kurmi K, Dhiman I, Joshi S, Paulo JA, **Johnson CW**, Yoda S, Baquer G, Ruiz D, Stopka SA, Kelley L, Sequist LV, Lin JJ, Agar NYR, Haigis KM, Gygi SP, Hata AN, Haigis MC. GUK1 activation is a metabolic liability in oncogene-driven lung cancer. *In review at Cell.*

Thesis

1. **Johnson CW**. Structural Analysis of Arginine 97 Mutants in the Allosteric Switch of Ras [Thesis] Raleigh (NC): NC State University; 2012. Link: http://www.lib.ncsu.edu/resolver/1840.16/7699.

2. **Johnson CW**. Allosteric communication in the activity of Ras GTPases [Dissertation] Boston (MA): Northeastern University; 2015. Link: http://hdl.handle.net/2047/D20199679.

Poster Presentations Presented at Professional Meetings (last 5 years)

1. **Johnson CW**, Cook J, Shui B, Hull S, Yang MH, Sheth S, Murphy BM, Burd CE, Haigis KM. Ala59 mutants of RAS cooperate with other MAPK signaling pathway mutations in the colon. The Fourth RAS Initiative Symposium. 2022. National Cancer Institute at Frederick, MD.

2. **Johnson CW**, Cook J, Hull S, Burd CE, Haigis KM. Codon 59 mutants of KRAS cooperate with other MAPK pathway mutations in the colon. The regulation and function of small GTPases conference. FASEB. 2022; Vermont Academy, Saxton River, VT.

3. **Johnson CW**, Cook J, Hull S, Yang MY, Sheth S, Burd C, Haigis KM. Allelic heterogeneity determines cooperation or mutual exclusion between RAS oncogenes. Cancer Grand Challenges (CRUK) Virtual Science Forum 2022; Virtual.

4. **Johnson CW**, Seo H, Terrell EM, Gefflkin EA, Lakhani J, Song K, Hagel K, Popow O, Mattos C, Morrison DK, Dhe-Paganon SM, Haigis KM. Regulation of RAS function by active site autophosphorylation. American Society for Biochemistry and Molecular Biology special symposia series: PDB50: A special symposium celebrating the 50th Anniversary of the protein data bank 2021; Virtual.

5. Yang MY, Hunt B, **Johnson CW**, Simanshu D, Haigis KM. (2019). “Mutation of K104 abrogates the oncogenic properties of K-RasG12D.” AACR. Evolving landscape of cancer modeling; San Diego, CA.

6. **Johnson CW**, Mattos C, Haigis KM. Mutant codon 59 alleles of KRAS suggest changes in metabolic regulation by autophosphorylation. American Society for Biochemistry and Molecular Biology special symposia series: Frontiers in RAS pathobiology and drug discovery 2018; Stratton, VT.

7. Marcus K, **Johnson CW**, Sanchez J, Mattos C. (2016). “Crystal structures of acetylated HRas K104 mimic K104Q and mutant K104A suggest unique role of K104 in interlobe communication across HRas.” FASEB J. 1116.2-1116.2. San Diego, CA.

8. **Johnson CW**, Fetics SK, Davis K, Rodriguez J, Hendricks A, Mattos C. (2015). Allosteric control of conformational states in Ras regulates the intrinsic hydrolysis reaction in complex with Raf. FASEB J. 893.15. Boston, MA

9. **Johnson CW**, Fetics SK, Davis K, Rodriguez J, Mattos C. (2014). Stabilization of the allosteric switch in the R state in RasR97L allows the capture of AlFx as a transition state mimic of the intrinsic hydrolysis reaction. FASEB J. 113.

10. **Johnson CW**, Davis K, Mattos C. (2013). Study of the effect of Ca(OAc)2 concentration on the state of the allosteric switch in Ras GTPase mutants. FASEB J. 831.17.

11. **Johnson CW**, Rhode J. (2010). Morphological change in Piriqueta cistoides caroliniana (Morning Buttercup) Leaves under Different Moisture Extremes. Association of Southeastern Biologists.

12. **Johnson CW**, Rhode J. (2009). Genetic regulation underlying morphological changes in plants exposed to different moisture conditions. BIG SOUTH Undergraduate Research Symposium.

13. **Johnson CW**, Rhode J. (2009). Piriqueta cistoides caroliniana Leaf Morphology Under a Range of Moisture Conditions. Southeastern Population Ecology and Evolutionary Genetics conference.