Oliver Bonham-Carter

Curriculum Vitæ _{Updated: June 27, 2024}

Dept. of Computer and Information Science,
Allegheny College,
520 North Main Street,
Meadville, PA 16335
✉ *obonhamcarter@allegheny.edu*
`http://oliverbonhamcarter.com`
Orcid: 0000-0001-9032-0398

Education

2010 – 2016 **Ph.D. in Information Technology**, *University of Nebraska at Omaha*, Specialization: *Bioinformatics*.

2007 – 2009 **Master of Science in Mathematics**, *University of Nebraska at Omaha*, Specialization:*Mathematics with applications in Bioinformatics and Mathematical Biology*.

2004 – 2007 **Undergraduate Mathematics Course Work**, *University of Nebraska at Omaha*, *Preparation for graduate school*.

2002-2004 **Undergraduate Mathematics Course Work**, *Conservatoire National des Arts et Métiers, Paris, France*, *General Mathematics with applications in Science*.

2002 **English Technical Writing Workshop**, *Creighton University, Omaha, NE*.

1998 – 2000 **French Cultural Studies**, *Université de La Sorbonne, Paris, France*, Diplômé: *Cours de Civilisation Française de la Sorbonne:French Linguistics, Culture and Literature*.

1995 – 1998 **Bachelors of Science in Biology**, *Creighton University, Omaha*, Focus: *Biology, Biostatistics, and Biochemistry*.

1996 - 1997 (Summers) **Diplomé**, *Université Stendhal-Grenoble 3*, *"Perfection of Oral French" and "Perfection of Written French"*.

Appointments

2024 Fall-current **Associate Professor, Department of Computer and Information Science**, *Allegheny College*, Meadville, PA.

2017 - 2024 Spring **Assistant Professor, Department of Computer and Information Science**, *Allegheny College*, Meadville, PA.

2016 **Visiting Assistant Professor, Department of Computer Science**, *Allegheny College*, PA.

2014 - 2016 **Instructor, Management of Information Systems**, *University of Nebraska at Omaha*, NE.

2009 – 2016 **Graduate Research Assistant in Bioinformatics**, *Peter Kiewit Institute*, University of Nebraska at Omaha.

2007 – 2009 **Graduate Teaching Assistant in Mathematics**, *University of Nebraska at Omaha*.

2006 – 2007	**Mathematics Teacher and Tutor**, *South High School*, Omaha, Nebraska. Teach and tutor mathematics at the study center at South High School.
Summer 2006	**Educator**, *Durham Western Heritage Museum*, Omaha, Nebraska. Educator for the *"Engineer-It!"* youth summer camps and general public relations for visitors of exhibit.
Spring 2006	**Research Assistant**, *UNO/PKI & Omaha Zoo*, Omaha, Nebraska. Statistical software development for the Omaha Zoo.
2000 – 2002	**Data Technician**, *ValiGen S.A* , Paris, France. Project Manager Assistant; Database Management, Wet-lab data analysis, Management of the documentation (*SciDocs* literature mining project), Organization of internal database for scientific literature and documentation.

Teaching Experience

Allegheny College

Academic Discourse I, *FS 101*, Semester: Fall 2021.

Allegheny Enrichment: Data Analytics, *Area High School classes*, Spring 2022, Fall 2023.

Bioinformatics, *CMPSC 300*, Semesters: Spring 2016, Fall 2017, Fall 2019, Spring 2021, Fall 2022.

Data Analytics, *CMPSC 301*, Semesters: Fall 2017, Fall 2018, Fall 2020, Spring 2020, Summer 2021 (Scholarly), Fall 2021, Spring 2023, Allegheny Enrichment.

Database Systems, *CMPSC 305*, Semesters: Fall 2016, Spring 2018, Spring 2019, Fall 2020, Spring 2022, Fall 2023.

Discrete Structures, *CMPSC 102*, Semester: Fall 2018, Fall 2019, Fall 2022, Spring 2024.

Junior Seminar, *CMPSC 580*, Semesters: Spring 2017, Spring 2018, Spring 2019, Spring 2021, Spring 2022, Spring 2023, Spring 2024.

Operating Systems, *CMPSC 400*, Semesters: Spring 2017, Spring 2020.

Python programming and games, *Crawford Central Elementary Schools*, Outreach, Fall 2018 and Spring 2019, Three sessions.

Senior Thesis I and II, *First and second reader*, Semesters (Fall and Spring): 2016-2024, 40 projects as first reader, 22 projects as second reader.

Theory of Computation, *CMPSC 230*, Fall 2016.

University of Nebraska

Intro to Management of Information Systems, *Instructor, College of Information Science & Technology, University of Nebraska at Omaha*, Semesters (Fall and Spring): 2013 - Spring2016.

College Algebra, *Teaching Assistant, Department of Mathematics at University of Nebraska at Omaha*, Semesters (Fall and Spring): 2007 - 2009.

Intemediate Algebra, *Teaching Assistant, Department of Mathematics at University of Nebraska at Omaha*, Semesters (Fall and Spring): 2007 - 2009.

Research

Research Overview.

As a data scientist, my research focuses on designing and developing software tools that facilitate analysis of various data ranging from gene expression to text data. As an empirical scientist, I also follow the scientific method to develop research questions, design experiments using the tools I develop, analyze the results of my experiments, and make conclusions. To achieve this, I use statistical methods, machine learning models, and various computational techniques. My research addresses the challenges within the fields of data science, bioinformatics, health informatics, computational biology, and other related fields.

Selected Publications

May 2024
Oliver Bonham-Carter, *"Breaking Barriers in Research Projects: BeagleTM, a Powerful Python-based Text Mining Tool for Visual Discovery in Scientific Literature"*, CNB-MAC / PyCon, 2024, Poster: `https://www.oliverbonhamcarter.com/talks/pycon2024_poster_bonham-carter.pdf`.

August 2023
Abigail Waryanka, Becky Dawson, Oliver Bonham-Carter, *"DEG-PI: A Computational Tool that Identifies Differentially Expressed Genes and Enriched Pathways in Cancer Tissues"*, CNB-MAC / ACMBCB, 2023.

September 2023
Oliver Bonham-Carter, *"Text Analysis of Ethical Influence in Bioinformatics and its Related Disciplines"*, Future of Information and Communication Conference. Springer, Cham, 2024.

August 2021
Teaching Responsible Computing Playbook: Managing Resistance, *contributing author*, Mozilla Foundation.
Playbook made possible by the Responsible Computer Science Challenge, funded by Omidyar Network, Mozilla Foundation, Schmidt Futures, and Craig Newmark Philanthropies

August 2021
Teaching Responsible Computing Playbook: Service Learning, *contributing author*, Mozilla Foundation.
Playbook made possible by the Responsible Computer Science Challenge, funded by Omidyar Network, Mozilla Foundation, Schmidt Futures, and Craig Newmark Philanthropies

March 2021
Oliver Bonham-Carter and Yee Mon Thu, *"GenExSt: A Tool to Identify Correlation of Gene Expression after Normalization with Housekeeping Genes."*, Future of Information and Communication Conference. Springer, Cham, 2021, `https://github.com/developmentAC/genExSt`.

April 2020
Enpu You, Oliver Bonham-Carter and Janyl Jumadinova, *"Text mining in Python for Evaluating the Ethical Foundations in Computer Science"*, Poster featured at Pycon 2020, Python Software Foundation.
Poster: `https://us.pycon.org/2020/online/posters/`

May 2020   **Janyl Jumadinova and Oliver Bonham-Carter**, *"Integrating Ethics in Teaching Artificial Intelligence."*, In the Proceedings of the 33rd International Artificial Intelligence Society Conference (poster), 2020. Conference gathering was cancelled due to the pandemic.

March 2020   **Oliver Bonham-Carter**, *"BeagleTM: An adaptable text mining method for relationship discovery in literature."*, Future of Information and Communication Conference. Springer, Cham, 2020, `https://github.com/developmentAC/beagleTM`.

Sept 2019   **Oliver Bonham-Carter and Yee Mon Thu**, *"Systematic Normalization with Multiple Housekeeping Genes for the Discovery of Genetic Dependencies in Cancer."*, CNB-MAC / ACMBCB2019, 2019.

August 2016   **Oliver Bonham-Carter**, *"Patterns and Signals of Biology: An Emphasis On The Role of Post Translational Modifications in Proteomes for Function and Evolutionary Progression."*, Dissertation Thesis. University of Nebraska at Omaha, 2016.

August 2016   **Oliver Bonham-Carter and Dhundy Bastola**, *"PTM Tracker: A system for determining trends of PTM modification sites relative to protein domains."*, The IEEE International Conference on Electro Information Technology (EIT), 2016.

December 2015   **Oliver Bonham-Carter, Ishwor Thapa, Steven From and Dhundy Bastola**, *"A study of bias and increasing organismal complexity from their post-translational modifications and reaction site interplays"*, Briefings in Bioinformatics, 18.1 (2017): 69-84.

Nov 2015   **Oliver Bonham-Carter and Dhundy Bastola**, *"A text mining application for linking functionally stressed-proteins to their post-translational modifications"*, 2015 IEEE International Conference on Bioinformatics and Biomedicine (BIBM), IEEE, 2015.

July 2015   **Michael Camara, Oliver Bonham-Carter and Janyl Jumadinova**, *"A Multi-Agent System with Reinforcement Learning Agents for Biomedical Text Mining"*, Proceedings of the 6th ACM Conference on Bioinformatics, Computational Biology and Health Informatics (ACM-BCB), 2015.

July 2014   **Oliver Bonham-Carter, Jay Petersen and Dhundy Bastola**, *"A Content and Structural Assessment of Oxidative Motifs Across a Diverse Set of Life Forms"*, Computers in biology and medicine 53 (2014): 179-189.

February 2014   **Oliver Bonham-Carter, Ishwor Thapa and Dhundy Bastola**, *"Evidence of post translational modification bias extracted from the tRNA and corresponding amino acid interplay across a set of diverse organisms"*, IProceedings of the 5th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics (ACM-BCB), 2014.

July 2013   **Oliver Bonham-Carter, Jay Pedersen, Lotfollah Najjar and Dhundy Bastola**, *"Modeling the Effects of Microgravity On Oxidation in Mitochondria: A Protein Damage Assessment Across a Diverse Set of Life Forms"*, 2013 IEEE 13th International Conference on Data Mining Workshops (DMBIH). IEEE, 2013.

July 2013   **Oliver Bonham-Carter, Lotfollah Najjar and Dhundy Bastola**, *"Evidence of a Pathway of Reduction in Bacteria: Reduced Quantities of Restriction Sites Impact tRNA Activity in a Trial Set."*, Proceedings of the International Conference on Bioinformatics, Computational Biology and Biomedical Informatics, (ACM), 2013.

July 2013	**Oliver Bonham-Carter, Abhishek Parakh and Dhundy Bastola**, *"sEncrypt: An Encryption Algorithm Inspired from Biological Processes"*, 12th IEEE International Conference on Trust, Security and Privacy in Computing and Communications (TrustCom), IEEE, 2013.
May 2013	**Oliver Bonham-Carter, Joe Steele and Dhundy Bastola**, *"Alignment-free genetic sequence comparisons: a review of recent approaches by word analysis"*, Briefings in Bioinformatics, (2013): bbt052.
Nov 2012	**Oliver Bonham-Carter, Hesham Ali and Dhundy Bastola**, *"A base composition analysis of natural patterns for the preprocessing of metagenome sequences"*, BMC Bioinformatics 14. Suppl 11 (2013): S5.
Nov 2012	**Oliver Bonham-Carter, Hesham Ali and Dhundy Bastola**, *"A meta-genome sequencing and assembly preprocessing algorithm inspired by restriction site base composition"*, 2012 IEEE International Conference on Bioinformatics and Biomedicine Workshops (BIBMW), 2012.
May 2012	**Oliver Bonham-Carter, Lotfollah Najjar, Ishwor Thapa and Dhundy Bastola**, *"Distributions of palindromic proportional content in bacteria"*, 8th International Symposium on Bioinformatics Research and Applications (ISBRA), 2012.
May 2001	**Bruce M. Boman, Jeremy Z. Fields, Oliver Bonham-Carter and Olaf A. Runquist**, *"Computer modeling implicates stem cell overproduction in colon cancer initiation"*, Cancer research, 2001.

Current Research Projects

BeagleTM project development, *Text analysis platform to determine connections between scientific articles.*, Current project: `https://github.com/developmentAC/beagleTM`.

Gene Expression, *Programming a new analysis dashboard to determine the co-expression of genes with are likely playing roles in causing breast cancer onset.*, Current project: `https://github.com/developmentAC/genExSt`.

Selected Open Source Projects

GitHub Projects Portfolio, *Web: `https://github.com/obonhamcarter`*, An assortment of projects to facilitate teaching and or research.

Infomaid, *A simple textual AI RAG application using Ollama for generative AI, chatting with PDFs AND chatting (querying) documents prepared in xml.*, Web: `hhttps://github.com/developmentAC/infomaid`.

csvLoad, *Demo of how to open CSV files in Poetry.*, Web: `https://github.com/obonhamcarter/csv_load`.

GenePlayer, *DNA to Piano Music Converter: Put DNA sequences into piano from PubMed FASTA files.*, Web: `https://github.com/developmentAC/genePlayer`.

SenderReceiver, *A Python direct messaging tool.*, Web: `https://github.com/developmentAC/senderReceiver`.

GradeAlert, *A Python tool to help with reporting grades from CSV files for GitHub Classroom courses.*, Web: `https://github.com/developmentAC/gradeAlert`.

Morse-Encode-Decoder, *A Python learning tool to convert text to Morse code and Morse code to text.*, Web: `https://github.com/developmentAC/Morse-Encode-Decoder`.

GatorShot, *Web toy writtin in JavaScrips to superimpose the faculty photos from the Department of Computer Science at Allegheny College with your own live selfie. Topics include: webtoy, javascript, selfie, Allegheny College*, Web: `https://github.com/obonhamcarter/gatorShot`.

GenMus, *A Python program to convert genetic DNA sequence code into audible signals to allow a listener to detect structure from genetic samples. Topics include music, genetic code, DNA, coding, noncoding*, Web: `https://github.com/developmentAC/geneticMusic`.

GetCodingSeqs, *A Python project to create DNA data for analysis from Genbank files. This data comprises sequences that do or do not code for protein in nature, and could be applied to the GenMus project. Topics include: sequence generation, genbank parsing, coding regions, non-coding regions*, Web: `https://github.com/developmentAC/GetCodingSeqs`.

Dabble, *A customizable command line program written in GO to teach how to add macros and commonly used functions to terminals.*, Web: `https://github.com/developmentAC/dabble`.

Thee X Plus One, *A program to demonstrate the mathematics of the Collatz Conjecture*, Web: `https://github.com/developmentAC/three_x_plus_one`.

XvY, *A linear regression programming example written in Python*, Web: `https://github.com/developmentAC/xvy`.

Service

Open Source Curriculum

2024 March **Curriculum Development**, *Demmler Grant*, CIS Proposal for the Demmler Endowment for Innovative Teaching, 2024 Career preparation through hands-on learning in computing.

2023 May **Curriculum Development**, *Demmler Grant*, CIS Proposal 1 for the Demmler Endowment for Innovative Teaching 2023, Developing pathways through the new CIS curriculum.

2022 **Research Development**, *https://devisingresearch.com/*, A class-in-a-box website containing all materials, assignments, labs and activities used to teach juniors how to create a research idea, narrow it, determine feasibility and complete objectives. Other objectives include: gaining skill for applied research methodologies and for writing proposals..

2022	**Bioinformatics**, *https://computationalbioinformatics.com/*, A class-in-a-box website containing all materials, assignments, labs and activities used to teach bioinformatics at the college level. Objectives: Students learn how to use DNA, RNA and protein analysis to answer research questions. Other objectives include: learning how to write research papers in bioinformatics the health-life sciences..
2023, 2022, 2021	**CS Fundraising and Media Channel development on YouTube**, *https://www.youtube. com/@alleghenycis*, A collection of videos created for department fundraising initiatives {"Power-Up","Love at First Byte", and "Reboot"}' at the Department of Computer Information and Science..

Committees

2024	**Institutional Effectiveness Committee (Assessment of Education)**.
2023	**Internal Member of the Search Committee for the Department of Computer Science**.
2021	**External member of the Search Committee for the Languages Department**.
2019 - 2022	**Health Professions Advisory Committee (HPAC)**.
2017	**Quantitative Reasoning (QR) Rubric: Instrument Development and Writing Group for College Academic Bulletin Tags**.
2016 - 2017	**International Faculty**.

Selected Peer Review Service

May 2024, *Briefings in Bioinformatics*.
March 2023, *Briefings in Bioinformatics*.
Jan 2023, *Briefings in Bioinformatics*.
December 2022, *Briefings in Bioinformatics*.
July 2020, *SIGITE 2020*.
February 2019, *Briefings in Bioinformatics*.
December 2015, *Journal of Theoretical Biology*.
July 2014, *ACM BCB 2014*.
Jan 2015, *Briefings in Bioinformatics*.
May 2014, *BMC*.
January 2014, *ECIS2014*.
Sept 2013, *Briefings in Bioinformatics*.
July 2013, *Briefings in Bioinformatics*.
March 2013, *SciVerse ScienceDirect*.
February 2013, *SciVerse ScienceDirect*.
February 2013, *ECIS2013*.
September 2012, *Briefings in Bioinformatics*.
August 2012, *Briefings in Bioinformatics*.
January 2012, *ECIS2012*.

Selected Community Service

2024 **DataGators Desk**, *A group of data science students and I were available on Fridays at noon in the Campus Center to help students and faculty who were working with data, modelling, statistical evaluations and similar areas of data science in their research.*.

2024 **ReBoot Campaign: Fundraising Campaign for the Department of Computer Science**.

2023 **Love at First Byte: Fundraising Campaign for the Department of Computer Science**.

2022 **Power-Up: Fundraising Campaign for the Department of Computer Science**.

2017 **QR (Quantitative Reasoning) Tag creation committee**, *Creating a learning outcome rubric for the Quantitative Reasoning requirement*, Allegheny College.

2017 **Young Student Outreach Teaching**, *Computer video game programming instruction*, Allegheny College.

2017 **26th Annual Sigma Xi Conference**, *Judge of undergraduate biology research*, Penn State Behrend, Held in Erie, PA.

2013-2016 **Volunteer bioinformatics workshop**, *Presenter of bioinformatics publications for undergraduates*, Omaha, Ne.

2013-2016 **Volunteer bioinformatics workshop**, *Grade-school children's science*, Omaha, NE.

2012-2016 **Volunteer open house guide and presenter**, *University of Nebraska at Omaha*, Bioinformatics.

2014 **Guest presenter and Speaker**, *Talk: Skills for success*, Given to new 2014 Ph.D. student class, University of Nebraska at Omaha.

2015 **Volunteer scout master**, *Tiger Scouts of America (Boy Scouts group)*, Group coordinator for Troup 244, Meadville, PA.

2012 **Volunteer ICCS computer science conference**, *University of Nebraska at Omaha*, Group coordinator.

Memberships

2013 to Present **IEEE: Institute of Electrical and Electronics Engineers**.
2013 to Present **ACM: Association for Computing Machinery**.
2015 to Present **Delta Epsilon Iota: Academic Honor Society, University of Nebraska at Omaha Chapter**.
2019 to Present **AACR: The American Association for Cancer Research**.

Talks

May 2022 **ethiCS - Computing With Care** (Panel) https://www.youtube.com/watch?v=uvXBEaByh6k

Decemebr 2021 **Faculty Lecture Series at Allegheny College**: *Integrating Responsibility Into Computing* Info Link: `https://www.youtube.com/watch?v=A8QsWP9NGUs`

March 2021   **MozFest: Mozilla Festival**: *Responsible Computing Curricula – How do we do it?*   Info Link: `https://schedule.mozillafestival.org/session/877N8H-1`

March 2017   **Teaching Integrated Bioinformatics**: *St Vincent College,* Convention of PA Bioinformatics Instructors

Awards and Grants

June 2022   **AWARD: Demmler**: DATA SCIENCE Curriculum grant,Allegheny College,Award amount: $1250

June 2022   **AWARD: Demmler**: MICRO-CREDENTIAL development grant,Allegheny College,Award amount: $1250

Feb 2021   **AWARD: Demmler**: INTEGRATIVE INFORMATICS Curriculum grant,Allegheny College,Award amount: $625

Feb 2021   **AWARD: Demmler**: ECON Curriculum grant,Allegheny College,Award amount: $1250

March 2021   **GRANT**: Principle Investigator for grant entitled, *Responsible Computer Science Challenge: Stage II* of the Mozilla Foundation. Award amount: $64,000

March 2019   **GRANT**: Principle Investigator for grant entitled, *Responsible Computer Science Challenge: Stage I* of the Mozilla Foundation.Award amount: $144,000

Janurary 2016   **AWARD**: Helen Hansen Outstanding Graduate Student Award, University of Nebraska at Omaha Award amount: $500

December 2015   **AWARD**: Dissertation Scholarship, University of Nebraska at Omaha Award amount: $1,500

August 2015   **GRANT**: Recipient of the *NASA Nebraska Space Grant Fellowship*, NASA Nebraska Space Grant & EPSCoR, 6001 Dodge Street, CB 041, Omaha, NE 68182. Grant amount: $5,000

June 2015   **AWARD**: Anjuman Ara Changez Award of Academic Achievement, University of Nebraska at Omaha Award amount: $1,500

April 2015   **AWARD**: NASA recognition for research, Nebraska Academy of Science, Lincoln, NE

August 2014   **GRANT**: Recipient of the *NASA Nebraska Space Grant Fellowship*, NASA Nebraska Space Grant & EPSCoR, 6001 Dodge Street, CB 041, Omaha, NE 68182. Grant amount: $5,000

April 2014   **AWARD**: First Place: *Best Paper*, Student Capstone Conference, College of Information Science and Technology, Peter Kiewit Institute, Omaha, Nebraska. Award amount: $1,000

April 2014   **AWARD**: Second Place: *Award of Excellence in Research*, Student Capstone Conference, College of Information Science and Technology, Peter Kiewit Institute, Omaha, Nebraska. Award amount: $500

April 2014   **AWARD**: NASA recognition for research, Nebraska Academy of Science, Lincoln, NE

July 2013   **GRANT**: Recipient of the *NASA Nebraska Space Grant Fellowship*, NASA Nebraska Space Grant & EPSCoR, 6001 Dodge Street, CB 041, Omaha, NE 68182. Grant amount: $5,000

| April 2013 | **AWARD**: First Place: *Award of Excellence in Research*, Student Capstone Conference, College of Information Science and Technology, Peter Kiewit Institute, Omaha, Nebraska. Award amount: $1,000 |

Speaking Languages

English	Maternal
French	Fluent: reading, writing and speaking (*Ô, Mais Oui!*)

Computer Skills/Software

OS:	Linux, Mac, Windows
Web development:	11nty, CSS Page design & layout, Django, Flask, HTML, HUGO, JavaScript, Jekyll, Streamlit
General:	Git and GitHub programming, OpenOffice
Programming:	C/C++, GoLang, JavaScript, Java, MongoDB, Neo4J, Python, LaTeX, R-statistic, SQL
Graphics:	Creation via `https://www.canva.com`, DALL·E, GIMP, Inkscape, Krita, PhotoShop, Stable Diffusion (AI-image generation), Manim (Mathematical graphics in Python)
Cloud Computing:	Amazon Web Service (AWS), Cloud computing setup and operations, Docker, Kubernetes, Virtual Private Network (VPN) implementation
Video:	Green screening, Microphone adjustment, OBS, OpensShot, video recording, YouTube video channel growing
Mathematical:	Maple, Mathematica, MatLab, Octave, RStudio, R-Statistic, SPSS