Ben Norton

TECHNOLOGY. SCIENCE.

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EDUCATION

Master of Science in Geology

2008, University of Tennessee, Knoxville, TN

Bachelor of Science in Geosciences

2005, University of Arizona, Tucson, AZ

WORK EXPERIENCE

Head of Technology & Collections Data Curator   *07/2015–Current*

North Carolina Museum of Natural Sciences

Tasks: Develop technical strategies, solutions, and tools that support institutional priorities and address the operational needs of museum staff; Point–of–contact for cross-section technical collaborations and initiatives; Responsible for planning, development, management, and design of custom-built web applications and websites; UX/UI website and application designer; Administrator for all institutional digital assets and resources; Collections management; Data manager and curator; GIS application developer and map designer; Webmaster; Co-PI on multiple NSF grants.
Accomplishments: Developed and designed an array of custom web applications and websites; Lead developer, designer, and project manager for more than a dozen technical initiatives and development projects; Set policies and guidelines for the usage of web-based assets; Established collections data management protocols and institutional workflows for all collections; Published collection datasets to global biological data repositories; Awarded multiple NSF collections grants; Established QA/QC techniques and set data standards for collections data processing and analysis.

Museum Collections and Technology Consultant   *2019–Current*

Freelance

Tasks: Develop and design technology solutions for the management of natural history collections
Accomplishments: Currently leading a multi-year effort in collaboration with the largest natural history museums in Switzerland and the Specify Software Consortium to extend a major collections management system to earth science collections. Present and past clients include the Smithsonian Institute (Washington DC), Max Plank Institute (Germany), Specify Software Consortium, Movebank, and the Natural History Museums of Switzerland.

Freelance Developer   *2011–2013, 2017–Current*

Freelance

Tasks: Full-stack web developer and designer, Database application developer, Technology consultant
Accomplishments: Successfully managed a part-time freelance venture with a personal marketing strategy, contracts, questionnaires, and invoices; Ability to self–manage the development and administration of multiple projects while consistently satisfying client expectations; Deliverables include custom websites and database applications. Clients include HOPE Research Institute (Phoenix, AZ), Ecosystem Planning & Restoration (Tomball, TX), Museum of Life and Science (Durham, NC), North Carolina Environmental Restoration Association (Raleigh, NC), SAGE Patent Group (Raleigh, NC).

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Collections Data Curator
07/2013 – 07/2015

Research & Collections, North Carolina Museum of Natural Sciences

Tasks: Data manager and curator; GIS application developer and map designer; Database administrator; Webmaster

Accomplishments: Published collection datasets to global biological data repositories; Designed and developed the Online Collections website (*https://collections.naturalsciences.org*) and web mapping applications; Curated biological, paleontological, and geological collections datasets; Developed collections data workflow, a multi-tier system that is the backbone for collections data capture, processing, and publishing; Co-PI on multiple collections grants; Secretary of GIS working group; Created and implemented QA/QC techniques for collections data processing and analysis; Set data standards for collections data publishing.

Programmer/Analyst II
04/2010–05/2012

Global Climate Change and Environmental Sciences Unit, RTI International

Tasks: Developed and maintained software, systems, and websites for environmental research projects; Investigated new software and technologies to business and research needs; Collaborated on technical documentation and support proposal processes.

Accomplishments: Created the user interface and data access layers of a web-based GIS watershed modeling tool and decision–support system, waterFALL (*https://www.waterfall.rti.org*); Built and maintained websites for environmental projects using multiple architectures, DotNetNuke, ColdFusion/MSSQL, and XHTML/CSS; Created and maintained SharePoint workflows; Tested and debugged web and desktop applications; UX/UI designer; Converted mockups to functional websites and web applications; Created QA/QC techniques for data processing and analysis; Contributed to user guides, technical reports, and literature reviews; Applied science background in contributions to technical reports and literature reviews; Applied interdisciplinary background to support a diverse set of environmental research projects including monitoring of water and ground pollution, environmental impact assessments, urban waste management, and hydrologic modeling of watersheds.

Ecological Data and Metadata Scientist
03/2008–04/2010

Environmental Sciences Division, Oak Ridge National Laboratory

Tasks: Database developer and designer, ColdFusion web developer, Scientific data curator

Accomplishments: Balanced a diverse set of responsibilities, data curation, web development, and QA/QC technique development, between coincident projects, the Fluxnet (*https://www.fluxnet.ornl.gov*) and AmeriFlux (*https://public.ornl.gov/ameriflux*) Networks; Metadata and measurement data archivist for global micrometeorology and ecology projects; Modernized multiple frontend and backend of multiple websites and web applications; Improved UX and increased website usability, accessibility compliance, and search engine optimization; Redesigned, upgraded, and normalized existing MSSQL databases; Developed a custom XML schema for data archival; Provided logistical and technical support to scientific dataset publishing activities via a web-based data access system.

Graduate Teaching Assistant
08/2005–05/2007

Department of Earth and Planetary Sciences, University of Tennessee

Tasks: Researcher, Laboratory teaching assistant

Accomplishments: Established new image processing technique that led to substantial improvements in accuracy and precision with reductions in the required time for experiment and research expenses;

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Presented preliminary results at the Lunar and Planetary Science Conference in Houston, TX (March 2007); Taught introductory and advanced level courses; Received Outstanding Teaching Assistant award in 2006; Guest lecturer for Environmental Geology.

Research Assistant   *10/2002–04/2005*

Departments of Geosciences and Chemistry, University of Arizona

Tasks: Project team leader, research assistant, data processor, scientific instrumentation specialist
Accomplishments: Developed semi-automated data processing technique; Wrote technical documentation for instrumentation usage and data processing; Trained students for work with project-specific programs, instrumentation usage, and documentation procedures; Collaborated with the Arizona Mineral Museum (*https://www.uamineralmuseum.org/*) on project specimen acquisition and collections management activities; QA/QC published datasets for entry into the American Mineralogist Crystal Structure Database (*https://rruff.geo.arizona.edu/AMS/amcsd.php*); Conducted analytical experiments to identify phases using X-Ray Powder Diffraction and Raman Spectroscopic methods.

WEB PRESENCE

Portfolio	*https://mbnorton.com*
LinkedIn Profile	*https://linkedin.com/in/mbnorton*
Organizational Page	https://naturalsciences.org/ben
ORCiD Profile	*https://orcid.org/0000-0002-5819-9134*
GitHub Profile	*https://github.com/ben-norton*

PROFESSIONAL SKILLS

System and Application Development: Full Stack Engineer and Designer, DevOps Administration, UX/UI Design, Accessibility Standards Enforcement, Technical Documentation and Best Practices Writing

Data Science: Modeling, Computer Vision, Data Analysis, Data Curation and Quality Control, Standardization, Database Design, and Administration

Information Design: Geographic Information Systems, Data Visualizations, Imaging Analysis, Conceptual and Logical Data Modelling

Project Management: Leadership, Cross-team Communications, Task Management and Delegation, Budget Management, Risk Mitigation, Critical Thinking, Project Planning, Privacy and Legal Policy-maker

EXPERIENCE SECTORS

Content Management Systems	14 years
Data Publishing	13 years
Project Management	12 years
Cross-discipline Collaborations	10 years
Museum Collections	10 years
Systems Administration	8 years

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SKILL STACKS

- **Web Development:** Laravel MVC Framework, Vue.js, PHP, C# ASP.NET, ASP MVC, RESTful Web Services, Web GIS (ArcGIS API/Services, Leaflet, Google Maps, OGC Services), jQuery, Handlebars, Bootstrap, Three.js, d3.js, CSS3, HTML5, SCSS, Google Analytics, Amazon Web Services, 508 Accessibility, and W3C Standards.
- **Programming**: PHP, JavaScript, Python, SQL, VBA, ColdFusion, Bash, HTML, CSS
- **Content Management Systems**: WordPress, Drupal, Custom PHP-MySQL
- **Data**: Darwin Core, Wavefront OBJ/MTL, RESTful API, JSON/GeoJSON, XML/XSD, Vector/Raster GIS, ETL Processes, QA/QC, Metadata development, Data standards, and custom validation
- **Databases**: Microsoft SQL Server, MySQL, Filemaker Pro, PostgreSQL, Microsoft Access
- **Development**: Visual Studio, Eclipse, and Eclipse-based IDEs, PhpStorm, Subversion, Git
- **GIS**: ArcGIS/ArcMap, ArcGIS REST API, ENVI, PostGIS, QGIS, MapServer
- **Package Managers**: Node.js, Elixir, Gulp, Bower, Composer
- **Project Tools**: Slack, Jira, Basecamp, Swagger
- **Software**: Specify, Adobe Creative Suite, Inkscape, Blender, Visio, Windows, Mac, and Linux Operating Systems

APPOINTMENTS

- Review Manager, [Latimer Core Standard](#), *TDWG*   2022 – Present
- Co-Convener, [Mineralogical Collections Extension to the Darwin Core Standard](#), *TDWG*   2022 – Present
- Co-chair, Technical Architecture Group, *TDWG*   2021 – Present
- Core Contributor, [Camtrap DP](#), *TDWG*   2020 – 2022
- Chair, Technical Advisory Committee, *Specify Collections Consortium*   2019 – 2023
- Technical and User Committee Member, *Wildlife Insights*   2018 – 2021

AWARDS AND NOMINATIONS

- Excellence in Research for an M.S. Degree   *2007*
- Outstanding Graduate Teaching Assistant   *2006*
- Outstanding Senior Research Award Nomination   *2005*

VOLUNTEER EXPERIENCE

- Youth Soccer Head Coach, Town of Apex   *2022–Current*
- Kindergarten–2nd Grade Instructional Assistant and Tutor, *Briarcliff Elementary*   *2014–Current*
- Visual World iLab, *NC Museum of Natural Sciences*   *2011–2012*

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INSTRUCTIONAL EXPERIENCE

Martial Arts Instructor Assistant, *Vision Martial Arts, Cary, NC*

- *All Ages, 2018–2019, 2021 – Present*

Public Education Programs, *North Carolina Museum of Natural Sciences, Raleigh,* NC

- *Elementary Age, 2016–Current*
- *General Public, 2016–Current*

Guest Lecturer, *NC Museum of Natural Sciences & Appalachian State University, Boone, NC*

- *Star Formation, 2017 & 2018*
- *Introduction to Astronomy, 2015 & 2016*

Guest Lecturer, *University of Tennessee, Knoxville, TN*

- *Environmental Geology, 2005–2007*

Graduate Teaching Assistant, *University of Tennessee, Knoxville, TN*

- *Environmental Geology, 2005–2007*
- *Mineralogy, 2006*
- *Introductory to Geology, 2006*

SELECT PAST AND PRESENT PROJECTS

NCMNS Metrics Dashboard   *https://metrics.naturalsciences.org*

09/2022–Current

Developer, Designer, Information Architect

Architecture: Laravel MVC, AmCharts, d3, RestFUL API, MySQL, PostGIS

Type: Organization Analytics and Visualization Platform

Mineralogy Collections Extension   *https://www.tdwg.org/community/esp/mineralogy/*

09/2022–Current

Originator and Task Group Co-Convener

Organization: Biodiversity Information Standards (TDWG)

Type: Data Standard Extension

NCMNS API and Data Publishing Platform   *https://data.naturalsciences.org*

06/2021–Current

Developer, Designer, Information Architect, Administrator

Architecture: Laravel, Vue.js, REST API, MySQL, PostGIS, Leaflet

Type: Data Publishing, Distribution, and Management System

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Camtrap DP   *https://tdwg.github.io/camtrap-dp/*

06/2021–Current

Information Architect, Data Scientist

Architecture: Frictionless Data Package

Organization: Biodiversity Information Standards (TDWG)

Type: Data Standard

NCSM Online Collections   *https://collections.naturalsciences.org*

01/2019–Current

Project Manager, Designer, Developer, Administrator

Architecture: Laravel, Vue.js, jQuery, MySQL, AWS Cloud Storage

Type: Data Management and Sharing Platform

Wildlife Insights   *https://wildlifeinsights.org/*

06/2018–*Current*

Information Technology Consultant and Technical Liaison

Organizations: North Carolina Museum of Natural Sciences, Conservation International, Smithsonian Institute, Google

Ecosystem Planning & Restoration Website   *https://www.eprusa.net/*

03/2017–Current

Freelance Developer, Designer

Architecture: WordPress

Organization: Ecosystem Planning & Restoration

NCSM Collections Asset Management System   *https://cams.naturalsciences.org*

10/2016–Current

Project Manager, Designer, Developer, Administrator

Architecture: Laravel, Vue.js, jQuery, MySQL, AWS Cloud Storage

Organization: North Carolina Museum of Natural Sciences

Type: Digital Asset Management System

NCMNS Volunteer and Intern Management System   *https://volunteers.naturalsciences.org*

09/2016–Current

Designer, Developer, Administrator

Architecture: Laravel, jQuery, MySQL, AWS Cloud Storage

Type: Volunteer and Intern Management System

NCMNS Operations Dashboard

https://facilities.naturalsciences.org

07/2016–Current

Designer, Developer, Administrator

Architecture: Laravel, jQuery, MySQL, AWS Cloud Storage

Type: Facilities and Visitor Services Support Application

NCMNS External Creature Request System

https://ecr.naturalsciences.org

6/2016–Current

Project Manager, Designer, Developer, Administrator

Architecture: Laravel, jQuery, MySQL, AWS Cloud Storage

Type: Specialized Event Registration and Live Animal Management System

NC Science Museum Grant Program

https://ncmuseumgrant.naturalsciences.org/

05/2016–Current

Designer, Developer, Administrator

Architecture: Laravel, jQuery, MySQL

Type: Grant Application System

North Carolina Museum of Natural Sciences Website

https://naturalsciences.org

08/2015–Current

Designer, Developer, Administrator, Project Manager

Architecture: PHP, Twig Template Engine, WordPress, jQuery, MySQL

Type: Large Organization Website

AmeriFlux

https://public.ornl.gov/ameriflux (retired)

2008–2010

Designer, Developer, Webmaster

Architecture: ColdFusion, MSSQL

Type: Data Repository and Publishing System

Fluxnet

https://fluxnet.ornl.gov/fluxnet/

2009–2010

Designer, Developer

Architecture: Drupal

Type: Data Repository and Publishing System

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PUBLICATIONS/ABSTRACTS

Technical Architecture Group. 2023. Best practices for serializing booleans. Biodiversity Information Standards (TDWG). *https://mbnorton.com/BooleanBestPractices_TDWG_20230306.pdf*

Little, H., Byrd, C., Karim, T., Krimmel, E., **Norton, B.** (2022) Extinct Taxa in an Extant World: Working towards better fossil taxonomic representation. Biodiversity Information Science and Standards 6: e94417. *https://doi.org/10.3897/biss.6.94417*

Little, H., Karim, T., Krimmel, E., **Norton, B.**, Utrup, J., Walker, L.J., Van Veldhuizen, J. (2022) Community Data Mobilization in Wikidata: A paleontology perspective. Biodiversity Information Science and Standards 6: e94416. https://doi.org/10.3897/biss.6.94416

Norton, B. (2021) APIs: A Common Interface for the Global Biodiversity Informatics Community. Biodiversity Information Science and Standards 5: e75267. *https://doi.org/10.3897/biss.5.75267*

Desmet, P., Bubnicki, J., **Norton, B.** (2021) Camtrap DP: A frictionless data exchange format for camera trapping data. Biodiversity Information Science and Standards 5: e73188. *https://doi.org/10.3897/biss.5.73188*

Norton, B. (2021) Standardized value APIs: The next step in the evolution of biodiversity data sharing. Digital Data Conference Abstract. June 7-9, 2021.

Lasky, M., Parsons, A., Schuttler, S., Mash, A., Larson, L., **Norton, B.**, Pease, B., Boone, H., Gatens, L. and Kays, R. (2021) Candid Critters: Challenges and Solutions in a Large-Scale Citizen Science Camera Trap Project. Citizen Science: Theory and Practice, 6(1), p.4. DOI: *http://doi.org/10.5334/cstp.343.*

Norton, Michael B., (2008) *Volumetric Proportion Analyses* of *Carbonaceous Chondrites:* Implications for Accretion and Compositional Diversity. *Thesis (M.S.), University of Tennessee.*

Norton, Michael B., McSween Jr., Harry Y., (2007) Quantifying the volumetric abundances of the components of the Murray CM chondrite: A preliminary investigation. *38th Lunar and Planetary Science Conference, LPI Contribution No. 1338, p.1807.*

Dickinson, W. R., Geherls, G., Fox, J., Stair, K., Anderson, C., Ohja, J., Brown, R., **Norton, M. B.**, Riggs, N., Lehman, T., (2007) Sediment dispersal in Triassic fluvial systems of southwest Laurentia: Insights from U−Pb ages of Detrital Zircon grains. *Geological Society of America Abstracts with Programs, Vol. 39, No. 6, p. 235.*

Brown, Richard A., **Norton, Michael B.**, (2005) Detrital Zircons in the Gartra Member of the Chinle Formation in northern Utah: Implications for upper Triassic paleodrainage patterns. *Geological Society of America Abstracts with Programs, Vol. 37, No. 4, p. 46*

PUBLISHED DATASETS

Cove M, Gatens L, Norton B (2018): NCSM Mammalogy Collection. North Carolina State Museum of Natural Sciences. Dataset/Occurrence. *https://doi.org/10.36102/dwc.5*

Kammerer C, Weaver P, Norton B (2018): NCSM Paleobotany Collection. North Carolina State Museum of Natural Sciences. Dataset/Occurrence. *https://doi.org/10.36102/dwc.6*

Kammerer C, Weaver P, Norton B (2018): NCSM Vertebrate Paleontology Collection. North Carolina State Museum of Natural Sciences. Dataset/Occurrence. *https://doi.org/10.36102/dwc.9*

Smith J, Bogan A, Norton B (2017): NCSM Mollusk Collection. North Carolina State Museum of Natural Sciences. Dataset/Occurrence. *https://doi.org/10.36102/dwc.7*

Williams, B, McCuller, M, Norton B (2017): NCSM Non-molluscan Invertebrates Collection. North Carolina State Museum of Natural Sciences. Dataset/Occurrence. *https://doi.org/10.36102/dwc.8*

Gerwin J, O'Shea B, Norton B (2014): NCSM Ornithology Collection. North Carolina State Museum of Natural Sciences. Dataset/Occurrence. *https://doi.org/10.36102/dwc.2*

Hogue G, Hughes L, Norton B (2014): NCSM Ichthyology Collection. North Carolina State Museum of Natural Sciences. Dataset/Occurrence. *https://doi.org/10.36102/dwc.1*

Stuart B, Beane J, Norton B (2014): NCSM Herpetology Collection. North Carolina State Museum of Natural Sciences. Dataset/Occurrence. *https://doi.org/10.36102/dwc.3*

Kammerer C, Moran S, Norton B (2016): NCSM Invertebrate Paleontology Collection. North Carolina State Museum of Natural Sciences. Dataset/Occurrence. *https://doi.org/10.36102/dwc.4*

Lincoln C, Skupien G, Norton B (2021): NCSM Herbarium Collection. North Carolina State Museum of Natural Sciences. Dataset/Occurrence. *https://doi.org/10.36102/dwc.12*