

UMMZ MOLLUSK DIVISION - Division Details provided by Taehwan Lee

OVERVIEW

In September 2019, the UMMZ Mollusk Division completed the five-year Thematic Collections Networks (TCN) project, "InvertEBase: Reaching back to see the future: species-rich invertebrate faunas document causes and consequences of biodiversity shifts." During the grant period, we entered almost 110,000 new mollusk specimen records, imaged more than 11,000 lots, and georeferenced 33% of the total localities in the UMMZ mollusk database. This was a collective effort involving 53 participating students: 6 graduate, 45 undergraduate and 2 high school students. Training and mentoring students is a key role of the UMMZ. The 2019 Mollusk Division Graduate Student Curatorial Assistant, Andrew Wood, received his PhD in July 2019 (Figure 1). Under the direction of Tom Duda, Andrew's work on the adaptive radiation of cone snails examined what genetic attributes promote the diversity seen within this group. The Mollusk Division was awarded a new TCN grant: "PILSBRY: Enhancing access to taxonomic and biogeographical data to stem the tide of extinction of the highly imperiled Pacific island land snails." This collaborative network (Figure 2) will develop comprehensive online resources that will enable time-sensitive assessment of the systematics and conservation status of Pacific island land snails. With this new grant, the Mollusk Division will digitize ~100,000 specimens and associated ledger, field notes and references.

Emeritus Curator John ("Jack") B. Burch turned 90 this year (Figure 3). Jack completed his PhD studies in Zoology at the University of Michigan (UM) in 1959. He served as a Research Associate in the UMMZ from 1959 to 1963, and was then appointed as a faculty member of the Department of Zoology and a Curator in the UMMZ. During his time at UM, he also served as Curator of Molluscs at the Australian Museum (1975-1976) and a Regents Fellow at the Smithsonian Institution (1983-1984). He served as the Chairman of the Department of Ecology and Evolutionary Biology from 1979 to 1981. Jack's research encompasses varied topics in malacology and is global in scope. During his career, he published more than 270 scientific articles and books, and has been recognized through numerous awards from malacological and scientific societies. Jack advised numerous graduate students and postdoctoral research associates who have themselves gone on to contribute to the field of malacology in research and academic positions in the US and abroad.



Figure 1: Andrew Woods PhD Dissertation Defense: 18 Jul 2019 - Genetic drivers of diversification in the *Conus* adaptive radiation. Andrew's field studies took place in Okinawa, American Samoa, and Samoa.



Figure 2: PILSBRY TCN participants gathered at the 2019 ADBC (Advancing Digitization of Biodiversity Collections) Summit, Oct 2-3, 2019 Gainesville, FL. From left to right: Richard Pyle (Bishop Museum), Norine Yeung (Bishop Museum; Lead PI), Rüdiger Bieler (Field Museum), Petra Sierwald (Field Museum), John Slapcinsky (Florida Museum of Natural History), Taehwan Lee (UMMZ) and Jimbeen in parasitology, cytology and taxonomy of mollusks.



Figure 3: Jack Burch: Emeritus Curator Jack Burch became 90 years old in August. He served as Mollusk curator from 1963 to 2000. His contributions have

UMMZ MOLLUSK DIVISION**PERSONNEL – 36 total staff members in 2019**

Title	Name(s)
Curator	Tom Duda and Diarmaid O'Foighil
Collection Manager / Associate Research Scientist	Taehwan Lee
Emeritus Curator	John B. Burch
Postdoctoral Fellow	Amanda Haponski
Graduate Student Curatorial Assistants	Andrew Wood
Graduate Students	Peter Cerda, Trevor Hewitt and Andrew Wood
Graduate Research Assistants	Rochelle Campbell, Julia Dellick, Edward Lo, Emily Nagy, Lorena Cortes Torres and Benjamin Woerner
Undergraduate Research Assistant (Student Temp)	Brij Banerji, Emily Brown, Tatiana Cuevas, Alexander Davis, Pagie Dotson, Madeleine Klemz, Katherine Klier, Kaitlin Koshurba, Cameron Leitz, Myah McCormick, Rachel Niesen, Hailey Pantaleo, Julie Pastorino, Austin Potter, Sihan Wang, Cody Williams, Olivia Young and Siyi Zhang
Volunteers	Alex Choi (High School Volunteer)
Administrative Specialist	Robbin Murrell (across all UMMZ divisions)
Registrar	Benjamin Hess (across Herbarium and all UMMZ divisions)

COLLECTION GROWTH / DATA ENHANCEMENT

Category	Number
Specimens Prepared	132 wet lots (490 specimens), 1 dry lot (5 specimens), 8 tissue lots (8 specimens)
Added to Collection	133 lots (132 wet, 1 dry)
Accessions	6 accessions (133 lots, 495 specimens) - 5 domestic, 1 foreign (Czech Republic)
Data Entries	30,808 created (timestamp created), 30,768 cataloged (collection object date), 31,228 modified (edited)
Locality	8,588 created, 22,377 modified
Images Added	1 JPG image (227 TOTAL attachments)

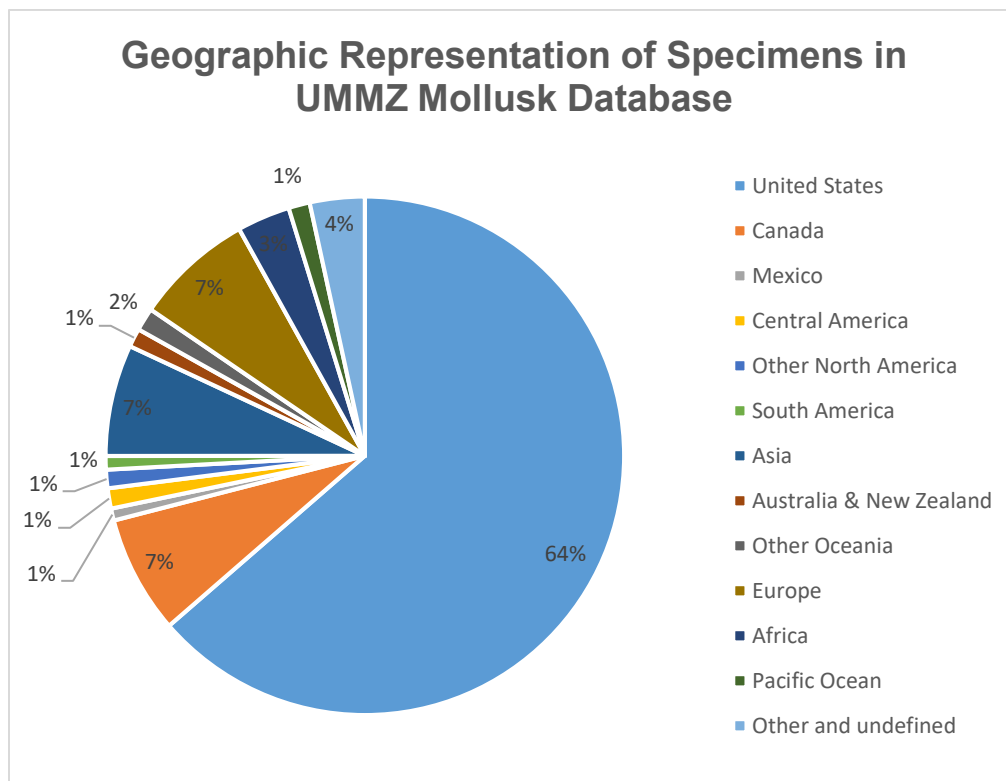
TAXONOMIC BREAKDOWN / TYPES / DATABASE STATUS

Category	Number
Taxa Represented	190 Families, 1,825 Genera, 14,832 species (from Specify Statistics Holdings tab – increase of 26 Families, 416 Genera and 3,546 species)
Types Represented	1,515 type specimens (177 new in 2019; indicated in Specify Statistics tab): 125 new topotypes, 79 new cotypes, 63 new paratypes
Percent of Georeferenced Specimens	42.49% of Specify entries
Highest Catalog Number	400,180 (highest cataloged lot – 5,000,000 estimated specimens)
Percent Databased	48.50% of lots in Specify (194,068/400,180) – 75% of dry collection

UMMZ MOLLUSK DIVISION

GEOGRAPHIC DISTRIBUTION

Global Locality	Total Lots in Specify in 2018	Increase 2018 to 2019	Total Lots in Specify in 2019
United States	114,273	9,193	123,466
Canada	12,983	1,307	14,290
Mexico	1,403	49	1,452
Central America	2,296	153	2,449
Other North America	1,585	651	2,236
South America	1,408	228	1,636
Asia	10,431	3,075	13,506
Australia & New Zealand	1,968	282	2,250
Other Oceania	2,264	517	2,781
Europe	11,090	3,280	14,370
Africa	5,420	1,001	6,421
Pacific Ocean	2,293	283	2,576
Other and undefined	5,553	1,082	6,635
TOTAL	172,967	21,101	194,068



UMMZ MOLLUSK DIVISION**REGIONAL DISTRIBUTION** – Regional and North American Representation of Specimens in Database

Regional Locality	Total Lots in Specify in 2018	Increase 2018 to 2019	Total Lots in Specify in 2019
Michigan	31,672	2,791	34,463
Midwest USA	55,870	4,673	60,543
Great Lakes US (w/PA & NY)	53,656	4,314	57,970
Great Lakes US (no PA & NY)	50,453	4,077	54,530
Ontario Province, Canada	10,850	1,195	12,045
North America	132,540	11,353	143,893

COLLECTION TRANSACTIONS

Category	Number
Loans	8 loans (45 lots, 346 specimens) - 8 domestic; 5 research, 2 exhibit/education, 1 education
Loans closed (returns)	1 loan (5 lots, 62 specimens) - 1 domestic; 1 education
TOTAL	9 transactions (50 lots, 408 specimens) - 7 unique institutions; 9 domestic; 5 research, 2 exhibit/education, 2 education

INQUIRIES AND DATA REQUESTS

Category	Number
Specimen Inquiries	39 inquiries: 25 about collection, 11 image requests, 3 identification
General Requests	19 requests: 16 information about mollusks, 2 georeferencing request, 1 publication questions
TOTAL	58 inquiries and requests

VISITATION TO THE COLLECTION

Category	Number
Visits / Individuals	33 visits / 161 individuals
Unique Individual / Institution	23 unique individuals, 13 unique institutions/departments
Individual Visitor Type	7 Faculty/Curator/Other Professional, 0 Postdoctoral Researcher, 2 Graduate Student, 13 Undergraduate Student, 9 Class, 0 Public, 2 Other

CITATIONS (Works Published by Curators, Staff and Students, and from External Collection Use)

Category	Number
Citing Specimens	4
Curator/Student	4
Citations in GBIF	6 total (2 citations in 2019)

UMMZ MOLLUSK DIVISION

KEY CURATION ACTIVITIES / ACCOMPLISHMENTS

Details
More than 5,000 dry specimens belonging to the land snail superfamilies Helicoidea, Sagdoidea, Punctoidea, Testacelloidea and Urocoptoidea were reorganized according to the updated taxonomy.
Terrestrial gastropod taxonomic authority file registered in the Specify database were updated.
Cepaea specimens, land snails introduced from Europe during the nineteenth century, were collected locally by Tom Duda and his students and added to wet collection.
Paratype specimens of the newly described land snail species, <i>Euconulus fresti</i> , were deposited by Jeffrey Neckola (Masaryk University, Czech Republic)

CONFERENCES / MEETINGS / WORKSHOPS

Details
ADBC Summit 2019: Advancing Digitization of Biodiversity Collections (ADBC) ninth annual summit Oct 2-3, 2019 Gainesville, FL (participant Taehwan Lee)
Data Meeting: Digital Data in Biodiversity Research Conference June 10-12, 2019 Yale Peabody Museum, Yale University, New Haven (participant Taehwan Lee)
World Congress of Malacology, Aug. 11-16, 2019, Pacific Grove, CA (participants Diarmaid Ó Foighil and Amanda Haponski)
Evolution of freshwater bivalves presentation - The Freshwater Mollusk Conservation Society in San Antonio TX, April 14-18, 2019 (participant Trevor Hewitt)
Poster: Unraveling cryptic morphological diversity in a marine snail species complex using nuclear sequence data. Peter Cerda, Trevor Hewitt, Amanda Haponski, Thomas Duda, Jr. Society for the Study of Evolution, Providence, Rhode Island. RI on June 21-25 (participant Peter Cerda)
Workshop: "A Comprehensive Petrochemical Vulnerability Index for Improved Decision-Making and Marine Biodiversity Risk Assessment in the Gulf of Mexico Large Marine Ecosystem" at Parque Nacional Peninsula de Guanahacabibes in western Cuba, June 2019. (participant Tom Duda)

GRANTS / AWARDS

Total Amount	Details
\$250,746	(Complete Sep 2019) National Science Foundation (NSF), Thematic Collections Networks (TCN): InvertEBase: Reaching back to see the future: species-rich invertebrate faunas document causes and consequences of biodiversity shifts.
\$54,781	(2019) NSF, TCN: PILSBRY: Enhancing access to taxonomic and biogeographical data to stem the tide of extinction of the highly imperiled Pacific island land snails.
\$305,527	TOTAL FROM GRANTS
	(Submitted) NSF, TCN: Mobilizing Millions of Marine Mollusks from the Eastern Seaboard (ESB) of the United States.
	(Ended in 2018) NSF, TCN: Documenting the Occurrence through Space & Time of Aquatic Non-indigenous Fish, Mollusks, Algae, & Plants Threatening North America's Great Lakes. \$429,777

UMMZ MOLLUSK DIVISION**GLOBAL AGGREGATORS / DATA PORTALS**

Portal & Division	Download	Seen / Viewed	Records Viewed (iDigBio Herbarium & VertNet)	Higher viewed number (Seen / Viewed versus Records viewed)	Origin or Time Frame
GBIF Mollusk	5,281	86,275,747	86,275,747	86,275,747	from 13 Jul 2018
iDigBio Aquatic Invasive Mollusks	7,418	1,711	2	1,711	from Oct 2016
iDigBio Mollusk	32,946	66,667	58	66,667	from Jul 2018
GreatLakesIN Mollusk					23 Mar - 31 Aug 2018
IvertEBase Mollusk					23 Mar - 24 August 2018
USGS BISON Mollusk	12,449	199,318	199,318	199,318	from Jan 2019
TOTAL	58,094	86,543,443	86,475,125	86,543,443	
AVG / MONTH	4,841.17	7,211,953.58	7,206,260.42	7,211,953.58	

GBIF – Global Biodiversity Information Facility

Statistic Category	2019 year total	Average per month
Number of Download Events (Search)	5,281	440.08
Number of Records Downloaded (total # of specimens)	86,275,747	7,189,645.58
Number of Downloads Requiring Georeferenced Records	1,648	137.33
Number of Downloads Using a Polygon Locality Region	1,039	86.58
Number of Downloads Based on a Country/Specific Locality Search	539	44.92
Percent of Searches Requesting Georeferenced Specimens	31.21	31.21
Maximum Percent Requesting Georeferencing, Polygon or Locality *** (see below)	61.09	61.09

*** GBIF Maximum percent assumes that georeferencing, polygon and country search are independent - data is not available to separate this. Maximum percent represents the greatest percent possible for searches looking for locality information.

UMMZ MOLLUSK DIVISION

iDigBio – Integrated Digitized Biocollections – Aquatic Invasives (former TCN grant project) Mollusk Division and Mollusk Division.

Statistic Category	Search – instances a record from this recordset matched a search query	Download – instances a record from this recordset was downloaded	Seen – instances a record from this recordset appeared (visually) in the search results in a browser window	Records Viewed – how many specimen records were opened and viewed in full detail	Media Viewed – how many media records were opened and viewed in full detail
iDigBio Aquatic Invasives Mollusk Division	3,355,332,148	7,418	1,711	2	0
iDigBio Mollusk Division	22,924,103,629	32,946	66,667	58	0
TOTAL	26,279,435,777	40,364	68,378	60	0
AVG / MONTH	2,189,952,981.42	3,363.67	5,698.17	5.00	0.00

USGS BISON – Biodiversity Information Serving Our Nation (BISON) - Explore and download North American species occurrence data and maps from Canada, USA, US Territories, and US Marine Exclusive Economic Zones.

Statistic Category	2019 year total	Average per month
Search indicates when any records from the dataset are included in the results of a front end search.	12,109	1,009.08
Download indicates when any records from the dataset are included in a front end download request.	340	28.33
SOLR indicates when any records from the dataset are included in the results of a SOLR query.	1	0.08
WMS (Web Map Services) indicates when any records from the dataset are included in the results of a WMS query.	186,868	15,572.33
All Requests is a combination of Search + Download + SOLR + WMS.	199,318	16,609.83