SCAN-LepNet TCNs

1. Overview and growth of SCAN

2. LepNet on Target

3. Broader Impacts for both: LightningBug Mass Digitization & Index of Arthropod Collections

SCAN
Symbiota Collections of Arthropods Network

LepNet
LEPIDOPTERA OF NORTH AMERICA NETWORK

Seeding Sustainable Digitization

SCAN TCN 2012-2016 (Active PENs continue)

1. **10** Collections, **6** funded PEN Projects, 2 pending
2. Original focus on Southwest Ground-Dwelling Arthropods
3. **2,252,066** records to date (2X expected)
4. **65** non-ADBC funded collections, **1,040,293** digitized records
5. **32** pubs on SCAN or using data
6. **Current focus = North American Arthropods, 21.3 million records and 4.7 million images**

NSF-ABI Symbiota2 2018-2021

Symbiota
Mobilizing Biodiversity Data

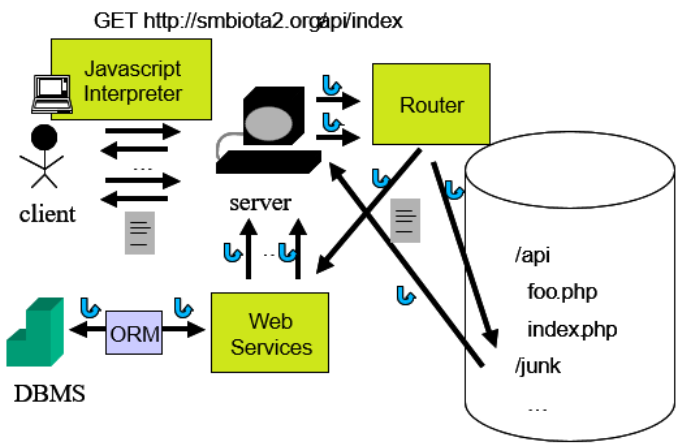
الصفحة الرئيسية بحث صور Symbiota خريطة الموقع Arabic

English
Arabic
Chinese
Farsi
French
German
Hindi
Italian
Japanese
Portuguese
Russian
Spanish
Urdu

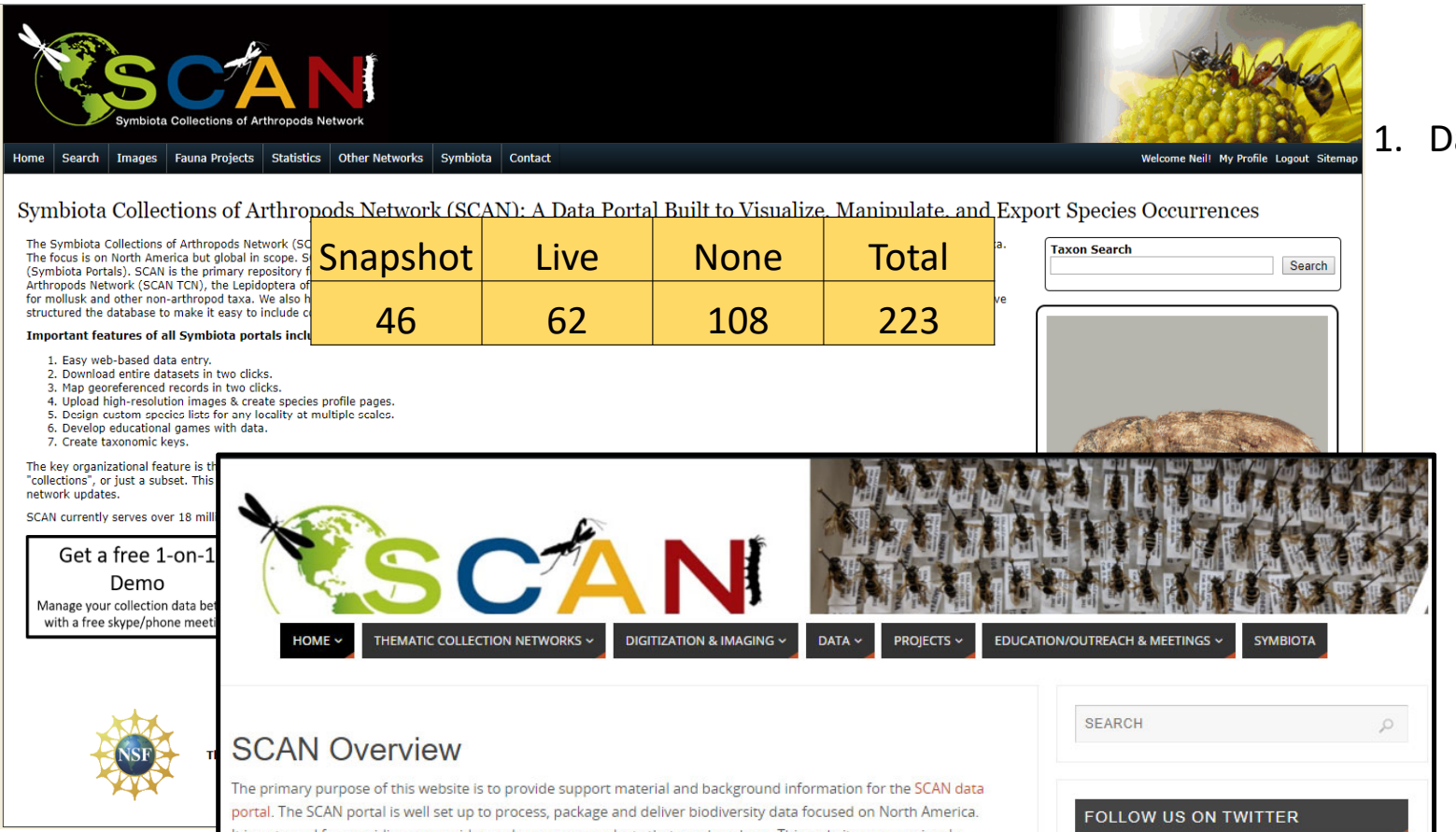
Symbiota مثات مجموعات التاريخ الطبيعي في أمريكا الشمالية ، Symbiota الأساسية المثبتة على خادم الويب. يتم استخدام SQL مع قاعدة بيانات Symbiota هو نظام إدارة محتوى مفتوح المصدر لتنسيق بيانات التنوع البيولوجي للعينات والمراقبة. تعمل ، والأسْدات ، والخلايا الطينية ، والطحالب ، والفطريات ، واللافقاريات ، وبدرجات أقل Symbiota والتي بدورها يتم تنظيمها في 30 بوابة مواضيعية. جمعت هذه البوابات مجتمعة 20 مليون سجل لحدوث الإيصالات خلال السنوات العشر الماضية. تشمل بوابات من الفقاريات. يمكن ربط السجلات الممسوكة بالصور والأنسجة وبيانات تسلسل الحمض النووي والمعلومات التصنيفية الأخرى.

لتوثيق حوادث التنوع البيولوجي استنادًا إلى العينات والملاحظات ، من خلال توفير أدوات معيارية لتبادل وتصور وتوليف بيانات التنوع البيولوجي للبحوث التي تعتمد على الأسئلة (على سبيل المثال عبر قوائم المراجعة والمفاتيح Symbiota يتمثل الهدف الأساسي لـ إنشاء برامج قوية ومتعددة الوظائف للتنوع البيولوجي وسير عمل معالجة البيانات ، بالإضافة إلى تنسيق علاقات البيانات للإدارة المرنة والنشر عبر الإنترنت ، كلٌّ من الأهداف القادرة على تفوق موارد تكنولوجيا المعلومات لمجموعة فردية. ومن الافتراضات المركزية لـ Symbiota ات جودة أعلى وأكثر فائدة للجمهور ، بدلاً من النموذج القديم لقواعد بيانات قائمة بذاتها يتم تخصيصها بشكل كبير في مؤسسة فردية. يشجع ، كل هذا يسمح لعلماء المجموعات بتركيز جهودهم على تنسيق مجموعات البيانات عالية الجودة Symbiota إطار تطوير برمجيات المصدر المفتوح في

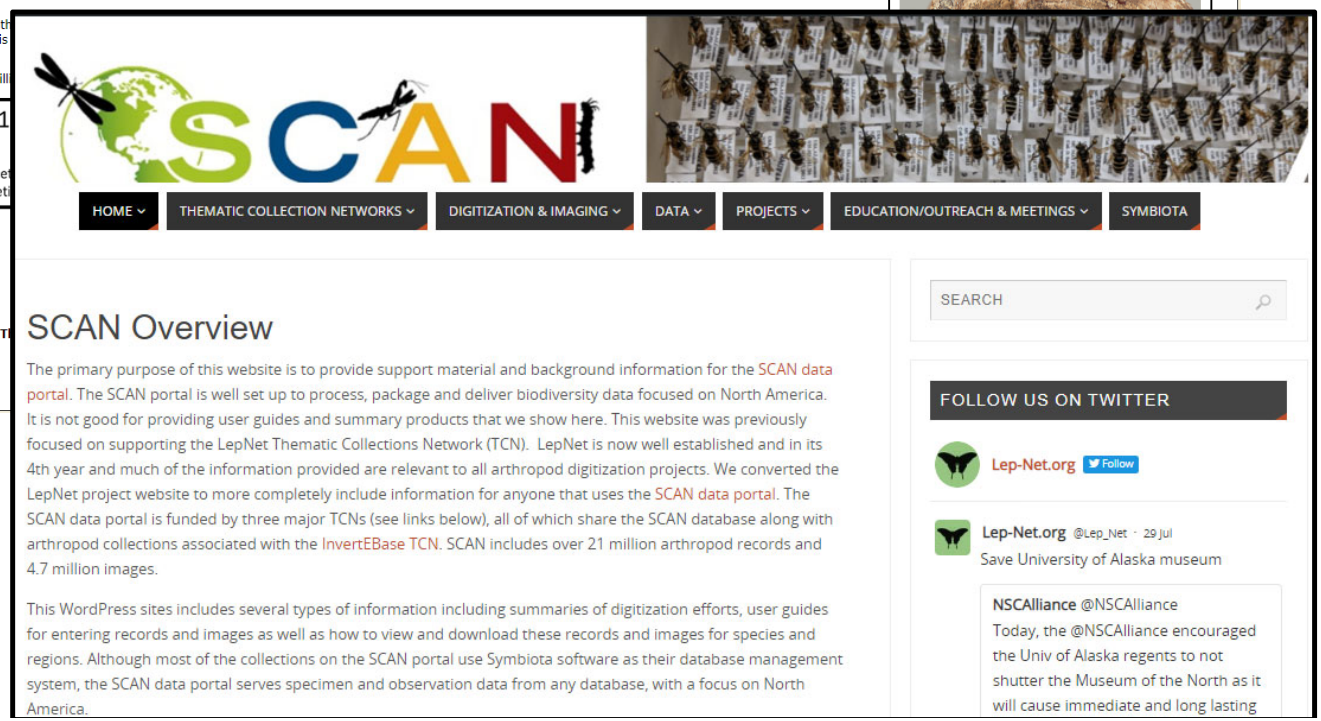
Skeletal version available now, plugins set for early-mid 2020



هذا المشروع أصبح ممكنا من خلال هذا جائزة المؤسسة الوطنية للعلوم



Snapshot	Live	None	Total
46	62	108	223



SCAN Portal

1. Data Portal
   - Tri-Trophic
   - InvertEBase
   - LepNet
   - Parasite Tracker
   - Original SCAN
   - North American collections & Larger North American data

2. Most Complete Occurrence data for North America (21 million records) (4.7 million images)

3. WordPress site
   Provides user guides, compiled data and literature

SCAN Progress and Challenges

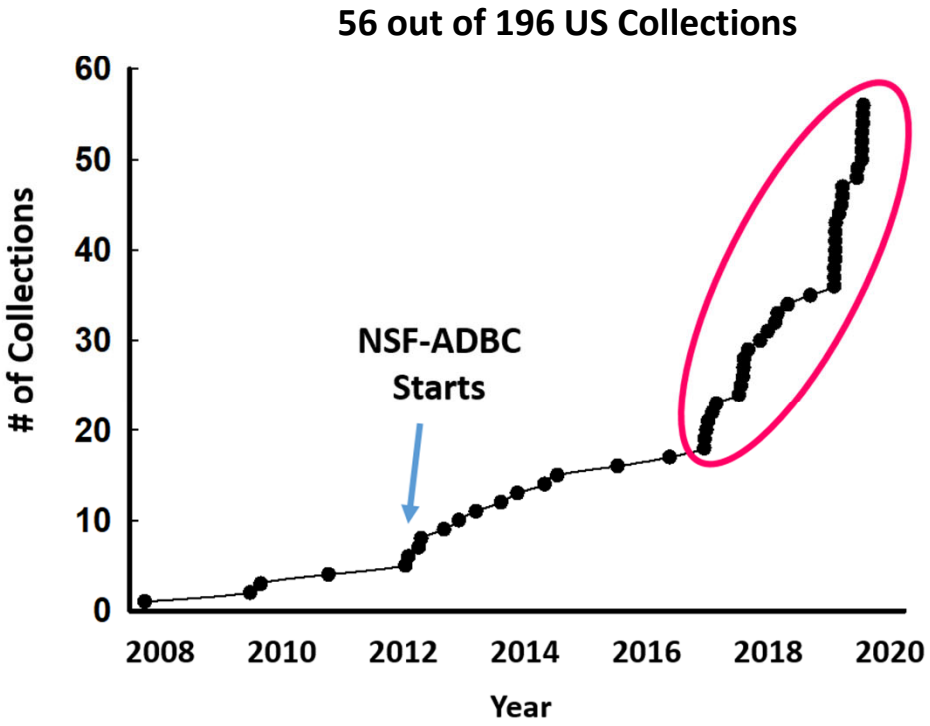
Five priority taxa are representative of most SCAN taxa

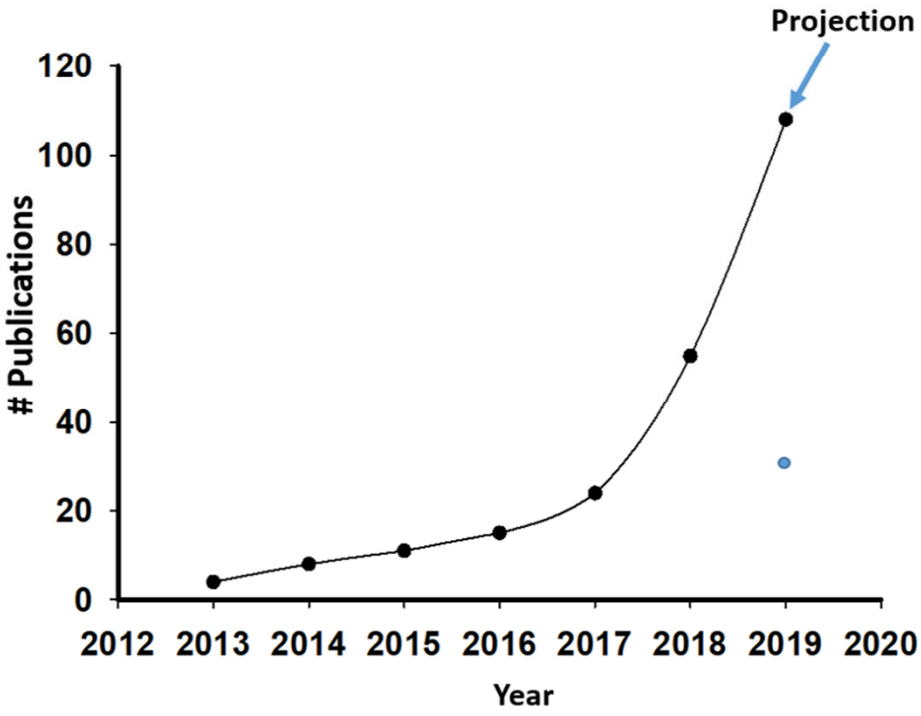
1. Significant number of records added every year
2. Need to continue making more data **research ready** – identifications are biggest bottleneck

Taxa	# Specimen Records	# Georeferenced	# Specimen Identified to species	# Georeferenced & Identified to species **Research Ready**
Formicidae - Ants	1,165,344	89%	56%	50%
Carabidae - Ground beetles	616,308	80%	66%	53%
Araneae - Spiders	240,161	81%	86%	70%
Acrididae - Grasshoppers	373,583	55%	95%	55%
Tenebrionidae Darkling Beetles	185,060	87%	62%	54%

United States Data Providers

GBIF Registration & Publications





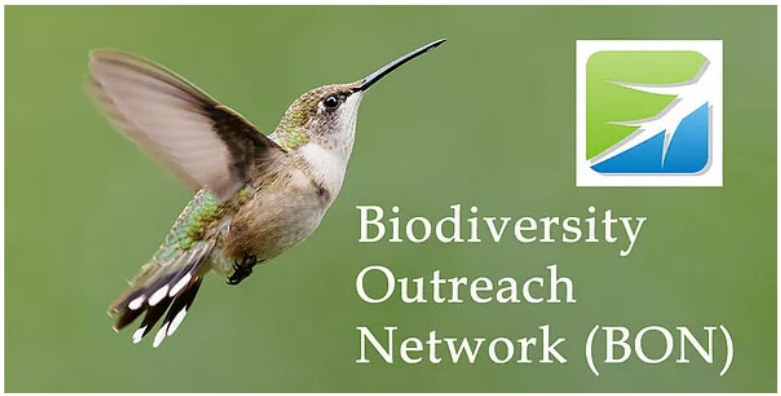
SCAN-LepNet Education-Outreach

Anne Basham

Biodiversity Outreach Network Non-profit

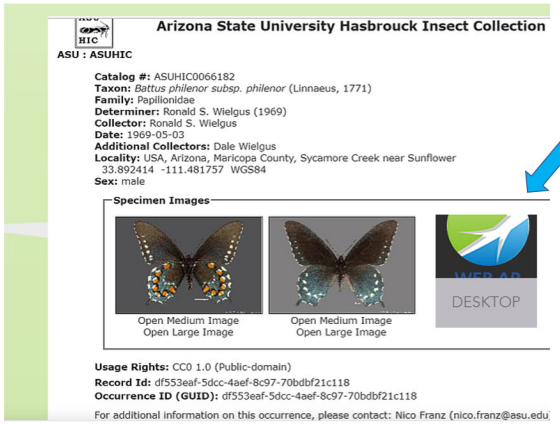
Just launched in September, 2019

BON-EARTH

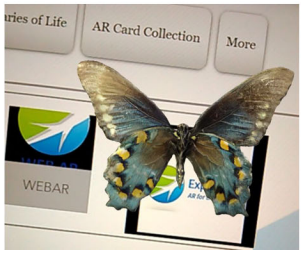


In partnership with museums, universities, government agencies, and nonprofits, BON-Earth is involved in the development of programs and projects that focus on bridging the gaps between digital data, the scientific community, and the community at large. From community-based exhibits, summer camps, and discovery centers, to the development of national public campaigns our products and programs are aligned with the mission to promote enrichment and biodiversity literacy while connecting people with each other and the natural world we share.

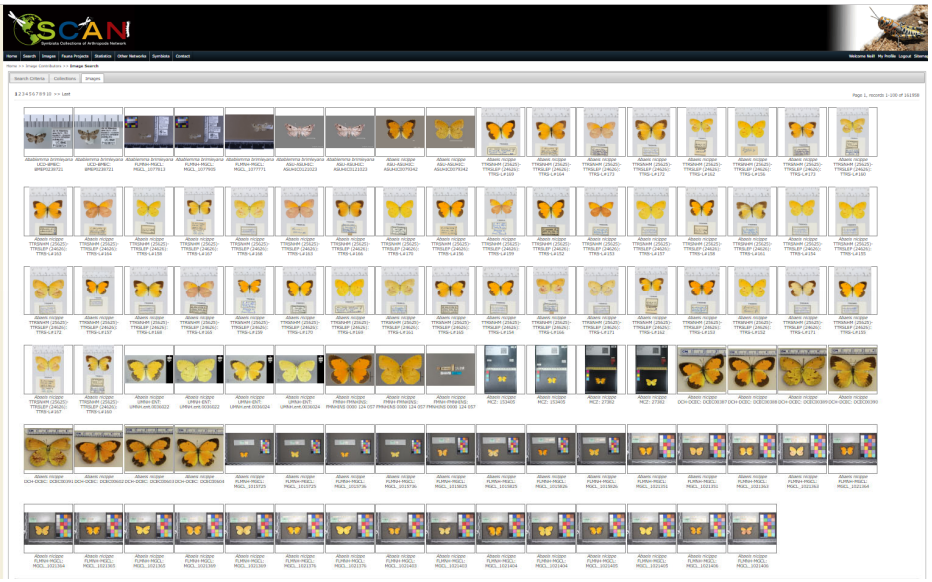
- LepXplor Phase II
- Integrating WebAR learning applications into Symbiota



Teachers can click on the app which will launch webcam enabling them to bring In real-time augmented reality specimens/content/data with their students.



LepNet
LEPIDOPTERA OF NORTH AMERICA NETWORK

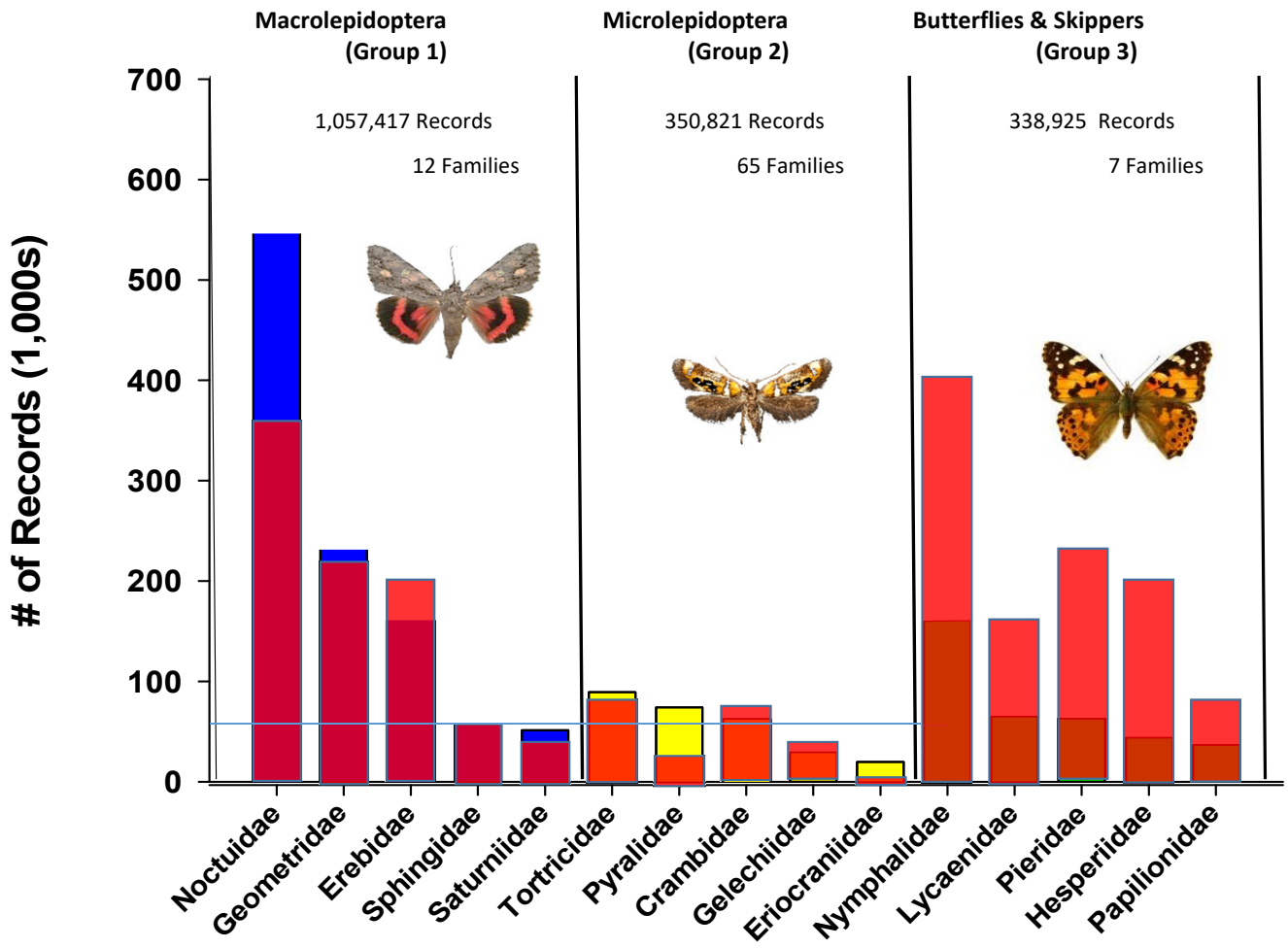


Core TCN Collections 2016-2020

1. Focus on North American Lepidoptera - ~142,000 species
2. **26** Collections, **1** PEN grant
3. **1.4** million records, **162k** images

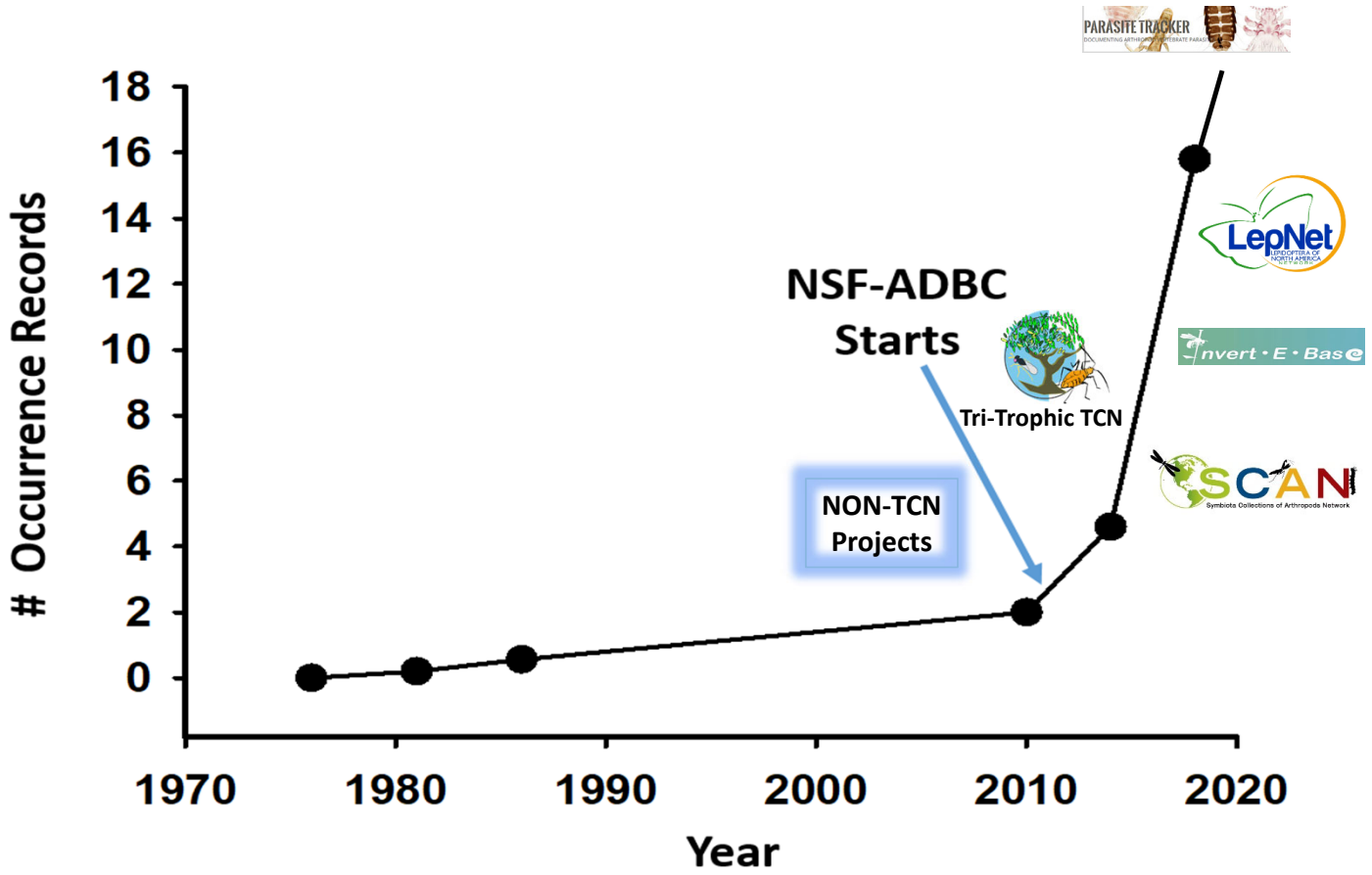
Broader Impacts

1. **132** collections contribute > **2 million** Lepidoptera records
2. **148** families represented
3. **93%** of records from North America, but **358** countries/regions represented


Macrolepidoptera
(Group 1)
1,057,417 Records
12 Families
Microlepidoptera
(Group 2)
350,821 Records
65 Families
Butterflies & Skippers
(Group 3)
338,925 Records
7 Families
# of Records (1,000s)
700
600
500
400
300
200
100
0
Noctuidae
Geometridae
Erebidae
Sphingidae
Saturniidae
Tortricidae
Pyralidae
Crambidae
Gelechiidae
Eriocraniidae
Nymphalidae
Lycaenidae
Pieridae
Hesperiidae
Papilionidae

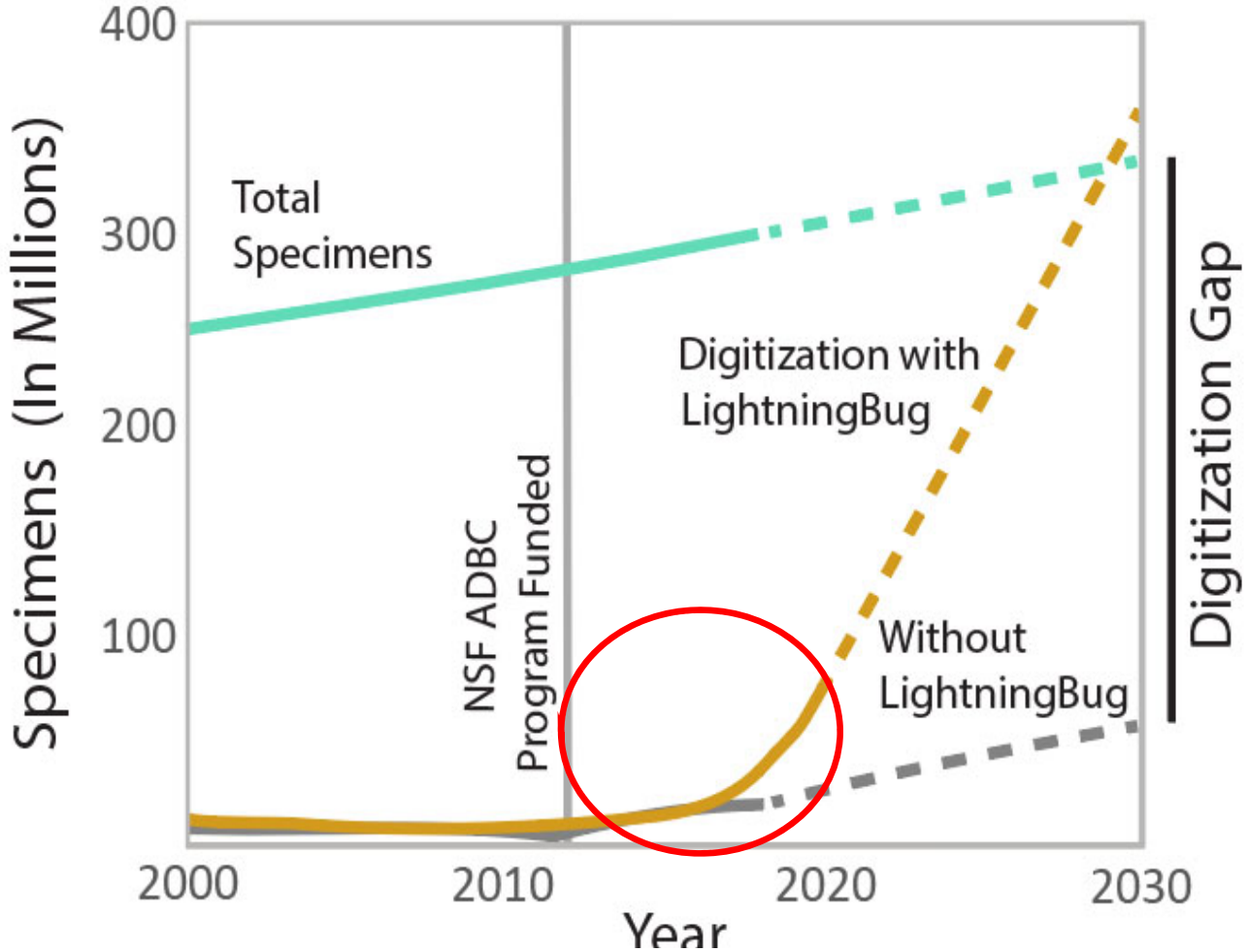
North American Data Providers: The ADBC Transformation

1,248 registered SCAN portal users



LightningBug

An Integrated Pipeline to Overcome the Biodiversity Digitization Gap



Compiled by Crystal Maier

LightningBug: Collectively, over 25 years of development

BugSnapper: Label reconstruction

Argonne National Laboratory

Notes from Nature OCR/HCR

COPIS: Photogrammetry

Yale Peabody Museum

1. A robotic-informatics system that will produce 3D images of both **specimens** and "**on-the-pin"** labels.

2. Reduce cost and increase efficiency of transcription by **10-fold**.

3. No specimen left behind: **3D research quality image suites** for each specimen, promoting a new research initiative on traits and automated species identifications.

LightningBug

An Integrated Pipeline to Overcome the Biodiversity Digitization Gap

Core Team

Yale – Nelson Rios (photogrammetry) Larry Gall (testing)

Argonne National Lab – Mark Hereld & Nicola Ferrier (label reconstruction & OCR)

Notes From Nature – Rob Guralnick & Michael Denslow (OCR, HCR, citizen science)

Harvard –Crystal Maier, Paul Morris, Jim Hanken (testing, archiving)

Collaborators

CSIRO – Simon Checksfield & Nicole Fisher (robotics, informatics, curation)

NHM– Ben Price (robotics & informatics)

The Field Museum – Petra Sierwald (testing)

U of Arizona - Wendy Moore(NEON – automated species identification, trait analyses

NEON-Macrosystem - Michael Wieser (NEON – automated species identification, trait analyses

Cal Academy – Chris Grinter (testing)

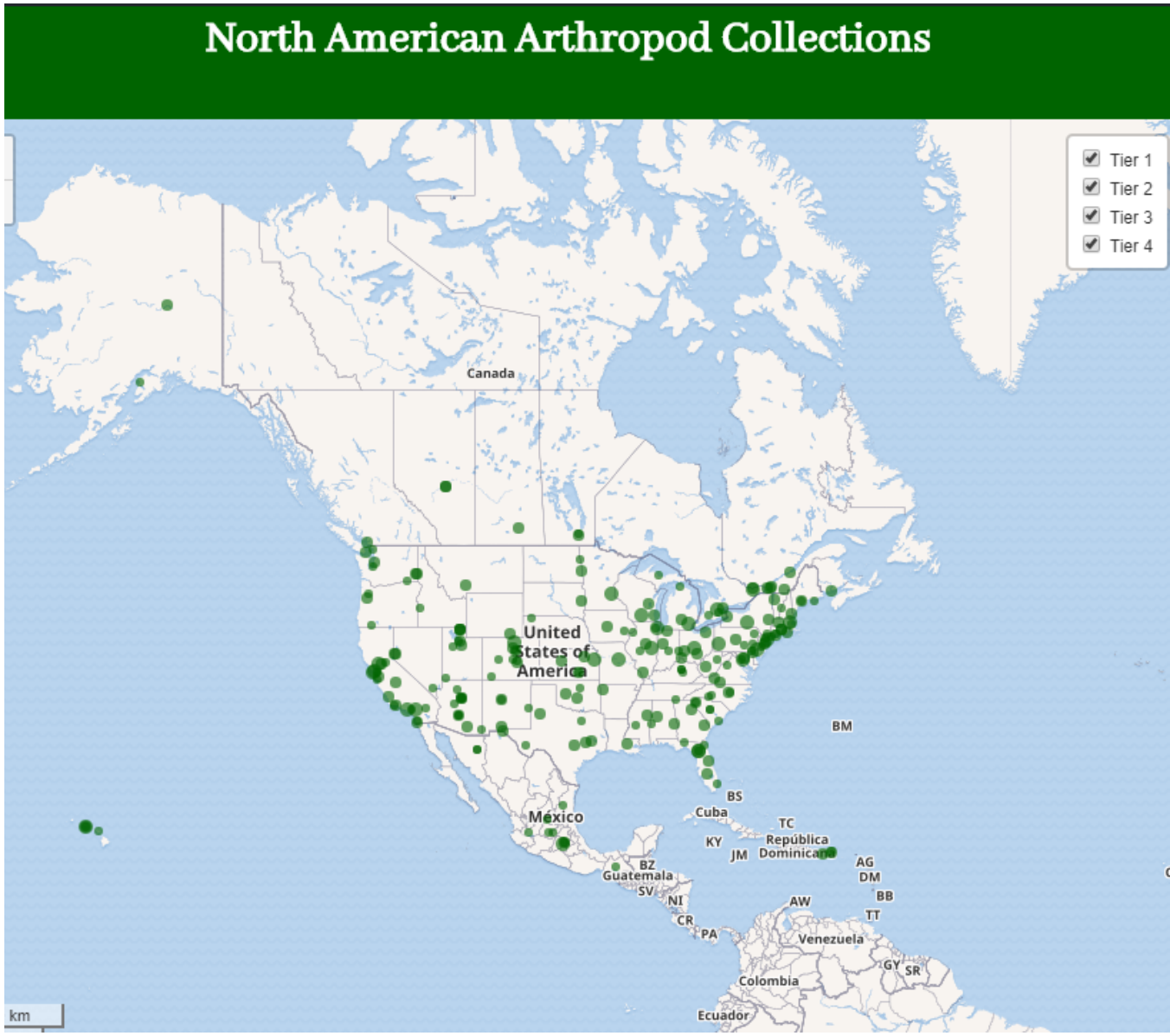
SCAN - Neil Cobb (Coordination among collections – CSBR preparation)

Building an Arthropod Collection Network

1. Index of Arthropod Collections

2. Patterned after Index Herbariorum

3. Phase One, Clickable map linked to collection websites and basic collection statistics.

4. Future: extend globally, have collections manage their information, use data for strategic planning.

The End