Education and Training for Library-based Bioinformatics Support:
Perspectives of Service Providers and Library Directors

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Bioinformatics

"Bioinformatics is the field of science in which biology, computer science, and information technology merge into a single discipline... There are three important sub-disciplines within bioinformatics: the development of new algorithms and statistics with which to assess relationships among members of large data sets; the analysis and interpretation of various types of data including nucleotide and amino acid sequences, protein domains, and protein structures; and the development and implementation of tools that enable efficient access and management of different types of information."
Prior research


- Existing staff or new hires?
- What knowledge and skills are necessary?
- Solely dedicated to bioinformatics tasks, or also traditional library roles?
- What skills are required for success?
- How well do scientists adapt to library culture?
- What kind of reporting structure allows library-based bioinformatics support to thrive?
The Current Study

Online surveys in 2008 and 2012 of:

- Bioinformatics support specialists (BSS)
- Librarians who serve molecular, genetics, bioinformatics-related researchers
- Librarians who do not serve such researchers
- Library directors who employ BSSs
- Library directors who do NOT employ BSSs

The surveys were sent to numerous email lists - MLA’s MolBio SIG, Informationist SIG, Cancer Librarians, SLA-DBIO, SLA-DST, SLA-DPHT, ACRL-STS
Who Are Bioinformatics Support Specialists in 2012? (n=23)

- **Education:**
  - 34.8% - advanced science degree only
  - 21.7% - MLIS only – no advanced science degree
  - 43.5% - both MLIS and advanced science degree (mostly MS)

- **Employment**
  - 73.9% in university or college health sciences library
  - 13.0% in university or college sciences library
  - 8.7% in university or college “main” library
Bioinformatics-related duties; respondents average 7.2/13 activities - 2012

- **95.5%** E-mail consultations
- **90.9%** In-person consultations
- **86.4%** Phone consultations
- **86.4%** Website or compilation of resources
- **81.8%** In-person workshops and training sessions
- **59.1%** Course-integrated instruction – graduate level
- **40.9%** Course-integrated instruction – professional students
- **36.4%** Host NCBI Discovery Workshops
- **31.8%** Seminar series coordinator
- **22.7%** Course-integrated instruction – undergrads
- **13.6%** Joint appointment in science department
- **4.5%** Host NCBI Webinars
Top 10 Skills/Knowledge Areas for BSS

- Knowledge of specialized databases and information seeking (4.67)
- Knowledge of research principles and practice (4.67)
- Ability to translate complex knowledge (4.52)
- Communication skills (4.51)
- Service orientation (4.50)
- Professionalism (4.49)
- Problem solving/analytical skills (4.38)
- Comprehensive subject knowledge and in-depth understanding of literature in the domain (4.37)
- Education/teaching skills (4.31)
- Confidence (4.26)
**Education and the Library World - Differences Across Groups**

<table>
<thead>
<tr>
<th></th>
<th>Bioinformatics Support Specialists</th>
<th>Directors With BSS</th>
<th>Librarians</th>
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<tbody>
<tr>
<td>It is important for library-based bioinformatics support specialists to understand library culture and values.</td>
<td>3.56&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.00</td>
<td>4.19&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>Bioinformatics support specialists must have a library/information science-related degree in order to provide successful library-based bioinformatics support services.</td>
<td>2.17&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.36</td>
<td>2.84&lt;sup&gt;b&lt;/sup&gt;</td>
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2008 Project

- Interviews with BSS and directors who hired them
- Focus groups with researchers
  - Most important – someone who wants to help others, not be primary researcher
  - In other words, service orientation
Service Orientation for BSS

- Top 3 ways to identify at interview:
  - Ask for specific examples of service – whether on the job, on faculty or association committees, volunteer work
  - Ask about teaching experience and perceptions of teaching
  - Provide scenarios in which candidate must demonstrate service orientation

- Top 3 ways to “teach” service orientation:
  - Shadow librarians/rotate through library departments
  - Have BSS perform library duties – chat reference, sit at reference desk, go through basic training for desk staff
  - Assign a librarian mentor with service orientation
# BSS – Most Useful Training

- NAWBIS (5-day advanced course) 5.00
- Science Degree 4.78
- NCBI Discovery Workshops 4.67
- NCBI Intro to Mol Bio Resources 4.60
- CE courses 4.57
- NCBI mini courses 4.38
- NCBI Field Guide 4.13
- NCBI webinars 3.80
Useful Training Attributes

- Lengthy – enough time to become immersed in the topic
- Hands on, problem-based, include context
- Broad topics, multiple resources (if training is lengthy)
- Focused resources (one-shot CE, webinar)

BSS concerns:
- No avenue for keeping up with new resources
- Most effective training/community building (NAWBIS) discontinued
Top 10 Skills/Knowledge Areas for Librarians

- Knowledge of specialized databases and information seeking (4.62)
- Communication skills (4.46)
- Service orientation (4.41)
- Professionalism (4.36)
- Knowledge of research principles and practice (4.23)
- Problem solving/analytical skills (4.18)
- Ability to translate complex knowledge (4.17)
- Confidence (4.01)
- Comprehensive subject knowledge and in-depth understanding of literature in the domain (4.01)
- Understanding of information technologies (4.01)
Librarians – Most Useful Training

- NCBI Discovery Workshops* 4.67
- NCBI mini courses 4.63
- Science Degree 4.58
- NCBI webinars 4.57
- NCBI Field Guide 4.56
- NAWBIS (5-day advanced course)* 4.50
- NCBI Intro to Mol Bio Resources 4.50
- CE courses 4.47
Why Training was Useful or Not

- No information as to why the class developed for librarians was considered less useful.
- A number of responses discussed how “overwhelmed” participants felt by the plethora and complexity of information.
- Science degree – contributed to an understanding of:
  - The scientific method
  - How science works
  - The culture of science
  - Information needs of scientists
  - Vocabulary
- The science degree was also considered useful in getting a foot in the door.
Biology Training for Librarians

• Scenario 1 – Workshop for Librarians
  • 73.1% of library directors were likely (34.6%) or very likely (38.5%) to send their librarians to such training (n=26)
  • 80.0% of librarians were willing (40.0%) or very willing (40.0%) to attend such training (n=30)

• What would make them more likely to send someone/attend?
  • Directors: 1 week workshop, tuition paid, all expenses paid
  • Librarians: Employer encouragement, various aspects paid
Biology Training for Librarians

- Scenario 2 – Lab Internship for Librarians
  - 66.1% of library directors were likely (40.1%) or very likely (26.0%) to send their librarians to such an internship (n=27)
  - 85.2% of directors were more likely to hire a librarian who had been through such an internship (n=27)
  - 53.3% of librarians were willing (30.0%) or very willing (23.2%) to attend such an internship (n=30)

- What would make them more likely to send someone/attend?
  - Directors: shorter internship, lab funding, librarians to provide only information services
  - Librarians: employer encouragement, lab funding, 2 week internship
Pertinent Associations

- Librarians serving molecular researchers (n=29)
  - Membership:
    ALA/ACRL 58.6%   MLA 37.9%   SLA 31.0%
  - Most important membership:
    SLA  27.6%        MLA 24.1%       ACRL-STS 17.2%
  - Subject specific SIGs, divisions and sections; networking

- Bioinformatics Support Specialists
  - Membership: (n=14)
    MLA 50.0%   AMIA Summits 28.6%   SLA 18.6%
  - Most important membership: (n=10)
    MLA 50%   AMIA Summits 30.0%
  - MLA – community, networking with BSS, CEs, Mol Bio SIG
  - AMIA Summits – leaders in science and policy of bioinformatics
Pertinent Conferences

- Librarians serving molecular researchers (n=23)
  - Conferences attended:
    - ALA 39.1%  MLA 26.1%  SLA 21.7%  ACRL 21.7%
  - Most important conferences:
    - MLA 26.1%  SLA 21.7%  ACRL 13.0%  ALA 8.7%
  - Why important – no real pattern but CEs and Mol Bio SIG common

- Bioinformatics Support Specialists
  - Conferences attended: (n=14)
    - MLA 85.7%  AMIA Summits 50.0%  Science of Team Science 28.6%
  - Most important conferences: (n=11)
    - MLA 54.5%  AMIA Summits 27.3%
  - MLA – networking with other BSS, see BSS services, CEs, Mol Bio SIG
  - AMIA Summits – advances in bioinformatics, science of bioinformatics
Summary

- In depth subject knowledge and service orientation are both important for bioinformatics support specialists and librarians serving molecular researchers.

- BSS value training that is immersive, and both BSS and librarians with science degrees appreciate the knowledge of science culture and research principles the degree affords them.

- Specialized training for librarians via workshop or internship in a lab setting are considered useful, but costs may be prohibitive.

- Pertinent association memberships and conferences (MLA, SLA, AMIA) are valued for their networking and CE opportunities.