Bridging Imaging Users to Imaging Analysis - 2024

Description: The purpose of this study is to inform our priorities and collaborative efforts for the Center for Open Bioimage Analysis (COBA), Bioimaging North America (BINA), the Royal Microscopical Society (RMS), and the Global Bio-Image Analysts' Society (GloBIAS). There is no minimum or maximum skill level in image analysis required to participate - we hope to get answers from people who have analyzed <10 images in their life all the way through to professional bioimage analysts. There are 15 mandatory multiple choice questions, 5 optional multiple choice questions, and 11 optional open-text-response questions. Completion should take 5-15 minutes depending on the number of open-text responses you provide.

Data resulting from this survey may be used in future publications, but individual responses to this survey will remain anonymous and no potentially identifying information is requested; please do not provide identifying information (such as your email address, name, or affiliation) in any of your responses if you wish to ensure your anonymity, as we will not be manually removing such information. By proceeding with this survey, you are agreeing that you have read, understand, and consent to this use of your data. If you have questions, please email COBA@broadinstitute.org.

* Indicates required question

1. I agree to these terms and conditions *

Mark only one oval.

- ◯ Yes
- ◯ No

Demographics

2. Which of the following roles best describes you? *

Check all that apply.

- ☐ Undergraduate/Graduate student
- ☐ Postdoctoral fellow
- ☐ Research scientist/associate/staff
- ☐ Facility director/manager
- ☐ Facility staff
- ☐ Image/data analyst
- ☐ Software engineer
- ☐ Principal investigator
- ☐ Clinician

3. Which of the following do you have significant formal training in or experience with? Select all that apply. *

Check all that apply.

- ☐ Physics/Biophysics
- ☐ Chemistry/Biochemistry
- ☐ Cell/Molecular Biology
- ☐ Developmental Biology
- ☐ Medicine
- ☐ Statistics/Biostatistics
- ☐ Image analysis/processing
- ☐ Computer science
- ☐ Electrical & Computer engineering
- ☐ Software engineering
- ☐ Computer vision
- ☐ Deep learning

4. Where do you currently primarily work? *

Mark only one oval.

- Africa
- Antarctica
- Asia
- Australia/Oceania
- Europe
- Near/Middle East
- North America
- South America

5. How would you describe your work? *

Mark only one oval.

	1	2	3	4	5	6	7	
Nea	◯	◯	◯	◯	◯	◯	◯	Nearizyinrg/tdheeyidmiangge oanmalaylsyiss (fmnodaliltiiets, aicgqhuti rtoinogl sim toa gaensa lfyozre a dpaatar,t ieccuu)lar experiment, optimizing the analysis, data mining

6. How would you rate your computational skills? *

Mark only one oval.

	1	2	3	4	5	6	7	
Very	◯	◯	◯	◯	◯	◯	◯	Excellent

7. How would you rate your comfort in developing new computational skills? *

Mark only one oval.

	1	2	3	4	5	6	7	
Very	◯	◯	◯	◯	◯	◯	◯	Very Comfortable

8. How manual would you say your current typical analysis workflow(s) are?

Mark only one oval.

	1	2	3	4	5	6	7	
Fully	◯	◯	◯	◯	◯	◯	◯	Fullyjaectso,neatced

9. How do you generally go about solving an image analysis problem? Check the approach(es) you use the most. *

Check all that apply.

- [ ] Sit down with a tool I know and start playing with the data
- [ ] Ask a friend or colleague to help me
- [ ] Ask a large language model (ChatGPT, BioimageIO, etc)
- [ ] Look up or ask on forum.image.sc
- [ ] Look up solutions generally on the internet (Google)
- [ ] Look up solutions on a particular website (please list below)
- [ ] Look up solutions in the scientific literature
- [ ] Other: _____

10. Have you ever used forum.image.sc, and how? *

Mark only one oval.

- ◯ I've never heard of it
- ◯ I've seen it come up in search results but I don't use it as a place to regularly look for information
- ◯ I use it as a place to look for information, but I don't post there (and don't especially want to)
- ◯ I use it as a place to look for information, but I don't post there (but I do want to or wish I could)
- ◯ I use it as a place to look for information, and I sometimes post questions there
- ◯ I answer questions and/or make announcements there, and may also sometimes post my own questions
- ◯ I answer questions and/or make announcements there only

11. How frequently do you use scripting to solve image analysis problems? *

Mark only one oval.

	1	2	3	4	5	6	7	
Alm	◯	◯	◯	◯	◯	◯	◯	Almost always or always

12. How frequently do you use machine learning (including but not limited to deep learning or Large Language Models) to solve image analysis problems'

Mark only one oval.

	1	2	3	4	5	6	7	
Alm	◯	◯	◯	◯	◯	◯	◯	Almost always or always

13. In regards to learning more about image analysis, how preferable do you find each of these instructional methods? *

Mark only one oval per row.

	Not at all preferable	Somewhat preferable	Moderately preferable	Very preferable
Scholarly "best practices" article				
Written step-by-step tutorial				
Video tutorial				
Interactive webinar				
One-on-one "office hours" with an expert				
In person seminar/tutorial lasting <1 day				
Multiday workshop				
Human+machine dialogues with an LLM				

14. How interested are you in learning more about the following topics? *

Mark only one oval per row.

	Not at all interested	Somewhat interested	Moderately interested	Very interested
Image analysis theory				
General image analysis best practices				
Image analysis practices related to my (sub) discipline				
Learning to use a particular software tool				
Deep learning as applied to image analysis				
Analyzing large images/large numbers of images				
Visualizing image analysis results				
Image analysis training and education (pedagogy)				

15. The next question will ask you about particular image analysis tools and techniques. Do you want to answer questions about microscopy in the field/area of life sciences or physical sciences?

Mark only one oval.

- Life sciences: e.g. biology, biomedicine *Skip to question 16*
- Physical sciences: e.g. chemistry, geology, materials sciences *Skip to question 23*

Life Sciences Image Analysis

16. What image analysis tools have you used before? (check all that apply) *

Check all that apply.

- [ ] Commercial software that comes with my microscope (Columbus, Nikon Elements, Softworx, Zen, etc)
- [ ] Other commercial software (Imaris, Huygens, Volocity, etc)
- [ ] Open source point-and-click software (ImageJ, Fiji, QuPath, Icy, CellProfiler, napari, etc)
- [ ] Computational libraries and scripts (Python e.g. scikit-image, MATLAB, etc)
- [ ] None

17. What image analysis tools do you use the most? *

Mark only one oval.

- ◯ Commercial software that comes with my microscope (ie Columbus, Elements, Softworx, Zen, etc)
- ◯ Other commercial software (Imaris, Volocity, etc)
- ◯ Open source point-and-click software (ImageJ, Fiji, QuPath, Icy, CellProfiler, napari, etc)
- ◯ Computational libraries and scripts (Python e.g. scikit-image, MATLAB, etc)
- ◯ None

18. If/when you use open source point-and-click software tools (e.g. ImageJ, Fiji, QuPath, Icy, CellProfiler, napari or others), what makes you select these tools in particular?

Mark only one oval per row.

	I do not use these tools	Not at all important	Somewhat important	Moderately important	Very important
Cost	◯	◯	◯	◯	◯
Ease of use	◯	◯	◯	◯	◯
Ease of access	◯	◯	◯	◯	◯
Flexibility	◯	◯	◯	◯	◯
Availability of tutorials	◯	◯	◯	◯	◯
The ability to perform analyses without prior programming knowledge	◯	◯	◯	◯	◯
Reproducibility/transparency about how analysis was done	◯	◯	◯	◯	◯

19. What kinds of images do you commonly want to analyze (select all that apply?

Check all that apply.

	2D	2D + time	3D (<3000x3000x100)	3D + time	3D (SPIM/large volume)	3D large volume + time
Brightfield/DIC/phase-contrast of cells or organisms from manually selected fields	☐	☐	☐	☐	☐	☐
Brightfield/DIC/phase-contrast of cells or organisms from an automated microscope (such as a high content imager)	☐	☐	☐	☐	☐	☐
Fluorescent images of cells/organisms from manually selected fields	☐	☐	☐	☐	☐	☐
Fluorescent images of cells/organisms from an automated microscope (such as a high content imager)	☐	☐	☐	☐	☐	☐
Histologically stained tissue sections	☐	☐	☐	☐	☐	☐
Electron microscopy	☐	☐	☐	☐	☐	☐
Imaging mass spectrometry	☐	☐	☐	☐	☐	☐
Imaging flow cytometry	☐	☐	☐	☐	☐	☐
Superresolution (PALM/STORM)	☐	☐	☐	☐	☐	☐
Autofluorescence imaging (i.e. FLIM)	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐

20. What image analysis problems (i.e. finding nuclei, tissue analysis, analysis of super-resolution data, etc) do you think are generally well-solved?

21. What image analysis problems (i.e. finding nuclei, tissue analysis, analysis of super-resolution data, etc) do you wish had easier/better solutions?

22. How do you decide when your workflow is right/good enough?

Skip to question 30

Physical Sciences Image Analysis

23. What image analysis tools have you used before? (check all that apply) *

Check all that apply.

- [ ] Commercial software that comes with my microscope (AutoMET, Gatan Digital Micrograph, Aztec, etc)
- [ ] Other commercial software (Avizo, Imaris, Volocity, etc)
- [ ] Open source point-and-click software (ImageJ, Fiji, Gwyddion, etc)
- [ ] Computational libraries and scripts (Python e.g. scikit-image, MATLAB, etc)
- [ ] None

24. What image analysis tools do you use the most? *

Mark only one oval.

- ◯ Commercial software that comes with my microscope (AutoMET, Gatan Digital Micrograph, Aztec, etc)
- ◯ Other commercial software (Avizo, Imaris, Volocity, etc)
- ◯ Open source point-and-click software (ImageJ, Fiji, Gwyddion, etc)
- ◯ Computational libraries and scripts (Python e.g. scikit-image, MATLAB, etc)
- ◯ None

25. If/when you use open source point-and-click software tools (e.g. ImageJ, Fiji, Gwyddion or others), what makes you use these tools rather than commercial software or computational libraries and scripts?

Mark only one oval per row.

	I do not use these tools	Not at all important	Somewhat important	Moderately important	Very important
Cost	◯	◯	◯	◯	◯
Ease of use	◯	◯	◯	◯	◯
Ease of access	◯	◯	◯	◯	◯
Flexibility	◯	◯	◯	◯	◯
Availability of tutorials	◯	◯	◯	◯	◯
The ability to perform analyses without prior programming knowledge	◯	◯	◯	◯	◯
Reproducibility/transparency about how analysis was done	◯	◯	◯	◯	◯

26. What kinds of images do you commonly want to analyze (select all that apply?

Check all that apply.

	2D	2D + time	3D (<3000x3000x100)	3D + time	3D (large volume)	3D large volume + time
Optical microscopy/DIC/fractography	☐	☐	☐	☐	☐	☐
Scanning electron microscopy (secondary electron or back scattered imaging)	☐	☐	☐	☐	☐	☐
Transmission electron microscopy (including electron diffraction and STEM imaging, e.g. HAADF-STEM)	☐	☐	☐	☐	☐	☐
Spectroscopy/diffractive imaging in the SEM/TEM (eg. EDS, EBSD, EELS, CL)	☐	☐	☐	☐	☐	☐
Imaging with mass spectrometry (eg SIMS/APT)	☐	☐	☐	☐	☐	☐
X-ray microscopy (including tomography)	☐	☐	☐	☐	☐	☐
Scanning probe microscopy (AFM, STM and related techniques)	☐	☐	☐	☐	☐	☐
Fluorescence microscopy	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐

27. What image analysis problems (i.e. segmenting particles, 3D reconstruction, spectroscopic analysis, extracting force/mechanical property measurements, etc) do you think are generally well-solved?

28. What image analysis problems (i.e. segmenting particles, 3D reconstruction, spectroscopic analysis, extracting force/mechanical property measurements, etc) do you wish had easier/better solutions?

29. How do you decide when your workflow is right/good enough?

Skip to question 30

Experiences and suggestions

30. Where did you hear about this survey? Please select all that apply. *

Check all that apply.

- [ ] The Images2Knowledge(I2K) conference
- [ ] Other conference or event
- [ ] Word of mouth
- [ ] My local microscopy facility
- [ ] Postings on image.sc forum or microforum
- [ ] A discipline-specific society or network
- [ ] Twitter / X
- [ ] Other social media (LinkedIN, BlueSky, Mastodon)
- [ ] Email list
- [ ] Central online calendar of events
- [ ] Other

31. Please select any of the following you have attended in the past

Check all that apply.

- [ ] Workshop/tutorial on imaging or image analysis
- [ ] Conference session on imaging or image analysis
- [ ] Conference dedicated to imaging or image analysis
- [ ] Hackathon (software development meetup) dedicated to imaging or image analysis

32. How would you most prefer to be notified about image analysis workshops, sessions, or conferences being planned?

Check all that apply.

- [ ] Word of mouth
- [ ] My local microscopy facility
- [ ] Postings on image.sc forum or microforum
- [ ] A discipline-specific society or network
- [ ] Twitter / X
- [ ] Other social media (LinkedIN, BlueSky, Mastodon)
- [ ] Email list
- [ ] Central online calendar of events
- [ ] Other

33. Are there any image analysis workshops, tutorials, or conferences that you have participated in and found particularly helpful? If yes, what made ther beneficial?

34. Have you put into practice things you have learned at image analysis workshops/tutorials? If not, why not?

35. Are there any conferences you've attended in the past that you think would particularly benefit from the addition/expansion of image analysis offerings

36. What specific topics (i.e. overviews of a particular tool, comparisons between pieces of software, or how to use a certain tool for a certain kind of experiment) would you like to see prioritized for future image analysis workshop and tutorial offerings?

37. What do you think analysis tool CREATORS (such as software developers) could/should do to make image analysis better and more successful? How best could we encourage them to do it?

38. What do you think analysis tool USERS (such as microscopists) could/should do to make image analysis better and more successful? How best could we encourage them to do it?

39. What, if anything, would make forum.image.sc more useful to you?

40. Any other thoughts?