

Submit to the *Proceedings of the National Academy of Sciences* (PNAS) and have your research discovered by millions of researchers in the Biological, Physical, and Social Sciences.

## About PNAS

PNAS has been at the forefront of scientific research for over a century. Established in 1914 as the official journal of the US National Academy of Sciences (NAS), PNAS is now one of the largest and most-cited multidisciplinary scientific journals in the world, with a global readership and more than 3,500 research articles published annually.

## Why Submit to PNAS?

### Comprehensive scientific coverage

PNAS publishes exceptional research in all branches of the Biological, Physical, and Social Sciences. We find that innovation often happens at the margins, and we are particularly interested in research that crosses disciplinary bounds, answers questions with broad scientific impact, or breaks new ground.

### Broad scientific audience

With one of the largest scientific audiences in the world, PNAS articles reach millions of top researchers each year. Our lower-income countries and open access programs further our mission to make scientific research accessible to all.

### Rapid, high-quality peer review

PNAS is edited by members of the NAS, a private, nonprofit society of distinguished scholars. Scientists are elected by their peers to membership in the NAS for outstanding contributions to research. Nearly 500 members of the NAS have won Nobel Prizes. The NAS is committed to furthering science in America, and its members are active contributors to the international scientific community.

On average, a full review takes just 45 days, and most articles publish within 6 months of submission.

### High impact

PNAS publishes some of the most highly cited research in the world. [Learn more about our 2020 article- and journal-level metrics.](#)

<b>228</b>	<b>0.807</b>	<b>10.3</b>	<b>2.904</b>
H5-Index	Eigenfactor	Cited Half-Life	SNIP
<b>16.2</b>	<b>4.791</b>	<b>11.205</b>	<b>3.164</b>
CiteScore	Article Influence	Impact Factor	Immediacy Index

## Submitting Your Manuscript

PNAS welcomes submissions in all scientific disciplines from researchers worldwide. Information on submitting your manuscript is included below. Please contact us if you have any questions about the submission process.

### PNAS Article Types

#### Unsolicited Article Types

**Research reports** describe the results of original research of exceptional importance. The preferred length of these articles is 6 pages, but PNAS allows articles up to a maximum of 12 pages. A standard 6-page article is approximately 4,000 words, 50 references, and 4 medium-size graphical elements (i.e., figures and tables).

- **Direct Submissions:** Most PNAS articles are Direct Submissions.
- **Contributed Submissions:** NAS members may contribute two research manuscripts annually within their area of expertise in which they had a direct, significant role in the design and execution of the work. Learn more about the [Contributed Submissions](#) process.

**Brief Reports** describe observations of immediate impact that may hold potential to initiate new avenues of research, provide compelling new data on controversies of broad interest and long-standing questions, or present a concise conceptual advance.

- **All Brief Report articles are published open access.**
- Brief Reports are limited to 3 pages, which is approximately 1,600 words (including the manuscript text, title page, abstract, and figure legends), and 15 references. They typically include no more than 2 graphical elements.
- Supporting information (SI) is limited to extended methods, essential supporting datasets, and videos (no additional tables or figures).
- All Brief Reports follow the [Direct Submission](#) mode of review and are not eligible as member-contributed submissions.

**Letters to the Editor** provide brief comments that allow readers to constructively address a difference of opinion with authors of a PNAS article.

- Letters are limited to 500 words, 2 graphical elements (figures or tables), and 10 references. Legends should only include brief descriptions of the figures. Supplemental information is not allowed.
- Letters may not include references to submitted papers or unpublished results, requests to cite the Letter writer's work, accusations of misconduct, or personal comments to an author.
- Letters must be submitted within 6 months of the first online publication date of the subject article.

#### By Invitation Only

**Commentaries** call attention to articles of particular note.

**Inaugural Articles** may be submitted by newly elected NAS members as a way to introduce themselves to the readers of PNAS and may present new ideas or hypotheses or describe the historical development of the member's field. [View the Inaugural Articles collection.](#)

**Front Matter** is a magazine section that tells the stories of science. Sections include News Features, Science and Culture, Inner Workings, Core Concepts, QnAs, Profiles, and the *Science Sessions* podcast. All of these elements are written or produced by science writers and journalists who receive assignments from PNAS editors.

**Opinions** are succinct essays that appear in the Front Matter section. Authored by researchers, Opinion pieces further the discourse or offer a call to action on a topic via a clearly articulated argument—made explicit early on in the piece—that includes novel ideas or proposals. All authors are welcome to submit proposals for consideration. Submissions deemed appropriate are reviewed by an NAS member with relevant experience. Submissions should be approximately 1,500–2,000 words, not including references, and do not require abstracts. Prospective authors should submit via the PNAS manuscript submission system and select "Opinion" when prompted for the desired manuscript type.

**Perspectives** should identify a critical science problem, provide a state-of-the-art assessment, and offer new insights or a new approach to its resolution. The narrative style may vary, but each Perspective should focus on an important area of research and be accessible to a broad scientific audience. Perspectives may help contextualize findings within a field or add a new dimension to previously published research. Current advances and novel insights are encouraged. To submit a proposed article, select "Presubmission for Perspective."

**Colloquium Papers** are reports of scientific colloquia held under NAS auspices.

## Initial Submissions

PNAS is format-neutral at initial submission, which means that manuscripts do not need to be formatted according to specific journal guidelines to be considered for review. We do, however, require the following information in order to evaluate your manuscript:

1. A manuscript file (in any format) including the following:
  - Title page (title, author list, classification, keywords)
  - Abstract
  - Significance statement
  - Main text
  - References
  - Figures or tables with appropriate legends (may be uploaded separately)
  - SI files (may be uploaded separately)
2. Contact and competing interest information for all authors.
3. Data sharing plans (including all data, documentation, and code used in analysis).
4. Funding information and whether open access has been selected.
5. A list of appropriate Editorial Board Members, NAS members, and qualified reviewers (minimum of three each) who are experts in the paper's scientific area. A brief justification for suggested reviewers is welcome, particularly for interdisciplinary papers.

PNAS will consider manuscripts for review as long as all components listed above are included in the submission. More granular details on manuscript formatting, including guidance on information to include in each section of the file, are included in the **Manuscript Formatting Guidelines** below.

For **Contributed** submissions, the NAS member acts as the corresponding author during the review process and must be a listed corresponding author on the published article. After completion of the review process, a coauthor may be designated to serve as corresponding author. These papers are published as "Contributed by" the responsible NAS member. **Academy members who have a competing interest, financial or otherwise, that could be seen to significantly impair their objectivity or to create an unfair competitive advantage for any person or organization tied to the research should submit their work as a Direct Submission.**

In addition to items 1–4 above, Contributed submissions must include the names of at least two experts who have agreed to review the manuscript. **The names and institutional affiliations of all reviewers of Contributed articles are published in a footnote.** These experts must:

- be from different institutions (from the authors and each other),
- not have collaborated with the authors in the past 48 months, and
- be free of any other competing interests.

The final version of the paper must be submitted by the last day of the year to count toward that year's annual limit.

## Revised Submissions

**Revised papers must be received within 2 months of the revision decision or they will be treated as new submissions.** If you require additional time, please notify [PNAS](#). In addition to the information provided at initial submission, revised submissions must also include:

- a point-by-point response to reviewer comments, and
- a tracked-changes version of the revised manuscript.

Revised Submissions are encouraged to follow all **Manuscript Formatting Guidelines**, including the **Publication-Ready Source File Guidelines**. Please note that multiple revisions are rarely permitted, and there is no guarantee that the paper will be accepted. Please contact us if you have any questions regarding manuscript formatting or the revision process.

# Manuscript Formatting Guidelines

## Manuscript templates

Please use the templates below to prepare your manuscript for PNAS.

Word	LaTeX (Overleaf)
<a href="#">Research Article</a>	<a href="#">Research Article</a>
<a href="#">Brief Report</a>	<a href="#">Brief Report</a>
<a href="#">SI Appendix</a>	<a href="#">SI Appendix</a>

Support for LaTeX templates is provided by [Overleaf](#). Please contact [PNAS](#) if you have questions about submitting in LaTeX and include the manuscript file as an attachment if possible.

## Manuscript order

Submitting manuscript sections in the following order will allow us to locate important information more easily and may speed the review process. Number all manuscript pages starting with the title page.

1. Title page
2. Abstract
  - Explain to the general reader the major contributions of the article
  - Include no more than 250 words
  - Cite all references in the abstract in full within the abstract itself AND in the text
3. Significance statement (Direct and Contributed Submissions only)
  - Explain the significance of the research at a level understandable to an undergraduate-educated scientist outside their field of specialty
  - Include no more than 120 words
4. Main text
  - Introduction
  - Results
  - Discussion
  - Materials and methods (describe procedures in sufficient detail so that the work can be repeated)
5. Acknowledgments and funding sources
  - Spell out all abbreviations
  - Use [FundRef](#) to identify the standard name for any funders
  - Do not include dedications
6. References
7. Figure legends

## Title page

Please include the following information on the title page:

Title Page Element	Description
Title	Keep the title brief (< 135 characters), descriptive, and comprehensible to a broad scientific audience. Include the studied organism. Avoid numbers, acronyms, abbreviations, punctuation, and puns.
Author Line	Include full names of all authors in the order intended for publication. Use asterisks (*) to designate co-corresponding authors and numbered footnotes to indicate equal contributions.
Author Affiliations	Include, in this order, department/laboratory/section/division, institution, city, state with ZIP code (for US institutions) or country with postal code (for non-US institutions). Use superscripts to match authors with institutions. Multiple affiliations are allowed. Affiliations where the work was done should be listed. If an author's affiliation has changed since the work was done, the current affiliation should also be listed and noted as such. Supply an <a href="#">ORCID identifier</a> for each author in both the manuscript and author profile(s). If an author does not have an ORCID identifier, PNAS strongly encourages them to obtain one. For proper authentication, authors must provide their ORCID at submission and are not permitted to add ORCIDs on proofs.
Corresponding Author	Include the name, complete address, phone number, and email address of the author(s) to whom correspondence and proofs should be sent. Note that corresponding authors' email addresses will be published in the article footnotes.
Preprint Servers	If applicable, note if a manuscript was deposited as a preprint, including to which server(s) and the licensing information in regards to the article.
Classification	Select both a major and minor classification category. Dual classifications are permitted between major categories.
Keywords	Include at least three keywords at submission.

## Classifications

Select a major (Physical, Social, or Biological Sciences) and a minor category from the following. Dual classifications are permitted between major categories. Dual classifications within a major category are only permitted in exceptional cases and are subject to Editorial Board approval.

### PHYSICAL SCIENCES

Applied Mathematics; Applied Physical Sciences; Astronomy; Biophysics and Computational Biology; Chemistry; Computer Sciences; Earth, Atmospheric, and Planetary Sciences; Engineering; Environmental Sciences; Mathematics; Physics; Statistics; and Sustainability Science.

### SOCIAL SCIENCES

Anthropology; Demography; Economic Sciences; Environmental Sciences; Political Sciences; Psychological and Cognitive Sciences; Social Sciences; and Sustainability Science.

### BIOLOGICAL SCIENCES

Agricultural Sciences; Anthropology; Applied Biological Sciences; Biochemistry; Biophysics and Computational Biology; Cell Biology; Developmental Biology; Ecology; Environmental Sciences; Evolution; Genetics; Immunology and Inflammation; Medical Sciences; Microbiology; Neuroscience; Pharmacology; Physiology; Plant Biology; Population Biology; Psychological and Cognitive Sciences; Sustainability Science; and Systems Biology.

## Main text

Please take note of the following when preparing your manuscript for PNAS:

- Do not include statements of novelty or priority.
- Avoid laboratory jargon.
- Use correct chemical names.
- Specify strains of organisms.

- Display trade names with an initial capital letter only.
- Provide names of suppliers of uncommon reagents or instruments.
- Use Système International units and symbols whenever possible.
- Only link to websites that are permanent public repositories, such as self-perpetuating online resources funded by government, academia, and industry. Links to an author's personal web page are not acceptable.
- Use standardized nomenclature for species-specific gene and protein names (see [Genecards](#), [MGI Nomenclature page](#), [HUGO Gene Nomenclature Committee](#), or equivalent resources).
  - Proposed gene names must be deposited to and approved by the appropriate nomenclature committee before publication of the article.
- Ensure that abbreviations are accessible to a broad scientific audience. Define all abbreviations that are specific to a particular field at first mention in the text.
- Use international standards on nomenclature. PNAS uses *Scientific Style and Format: The CSE Manual for Authors, Editors, and Publishers* (8th edition, 2014) as the primary style guide.
- If you believe your manuscript would benefit from professional editing, we encourage you to use an editing service (see list [here](#)) prior to submission. PNAS does not take responsibility for or endorse these services, and their use has no bearing on acceptance of a manuscript for publication.

## Publication-ready Source Files Guidelines

Once your manuscript has been accepted, PNAS will request publication-ready source files. Please use the following guidelines when preparing these files. Do not make extensive edits; PNAS only allows minor edits at proofs.

### Manuscript file

Manuscript files must adhere to the following:

- Word, RTF, or LaTeX format
- No embedded figures, tables, or schemes
- Equations must be editable; images are not acceptable
- In-text footnotes should be preceded by a footnote symbol, used in the order \*, †, ‡, §, ¶, #, ||, \*\*, ††, ‡‡, §§, ¶¶, ##

### LaTeX

The PNAS submission system runs PDFLaTeX (Overleaf's default). Please use the latest version of LaTeX2e to prepare your files. Using other versions or alternate engines (such as XeLaTeX or LuaLaTeX) may cause compilation issues at submission.

- [PNAS LaTeX template](#)
- [Equations spanning two columns](#)
- [Main class file](#)
- [Bibliography style file](#)
- [Main style file](#)
- [Additional LaTeX Instructions](#)

### Basic Rules

- Upload .cls, .sty, .bib, .bst, .bbl, and .ldf files using the "LaTeX Support File" file type. The PNAS submissions system treats each LaTeX submission as a single directory.
- Avoid nesting, cross-referencing, and using input commands, as these will cause compilation errors.
- Do not remove packages that are included in the Overleaf template.
- When adding packages to the template, ensure that their commands do not clash with existing packages.

### Figures and Tables

- Use the `\includegraphics` command within the main manuscript file and upload each



- figure source file in the submission system separately using the “Figure” file type.
- Include tables within the main manuscript .tex file only.

## References

- Use pnas-new.bst for the current PNAS bibliography style.
- Use the Automatic Journal Title Abbreviation package provided in Overleaf to prevent references from appearing longer than they would in publication.

## Resolving Compilation Problems in Submission

- To recompile the manuscript file, delete the original file from the submission and upload it again.
- Upload an alternate PDF as a “Related Manuscript File” if the system compiled PDF is incomplete or inaccurate.

## Figures

Supply figures and schemes as high-resolution files whenever possible. Please review the [PNAS Digital Art Guidelines](#) before uploading images. PNAS strives to ensure articles are accessible for readers throughout the world by offering article PDFs that are easily suitable for downloading in any environment. To accommodate size and content, article PDFs are processed to display images at 200 ppi, which will guarantee quality at print size. The HTML display of an article offers 300 ppi for all images. In addition, the option to enlarge each figure and table in the HTML display is available to closely review comprehensive details, as necessary.

- Provide all images at final size. While figures may be sized conservatively to save page space, PNAS reserves the right to make the final decision on figure size in published articles and authors may be asked to shorten manuscripts that exceed the stated length requirement.
  - Small: approximately 9 cm x 6 cm
  - Medium: approximately 11 cm x 11 cm
  - Large: approximately 18 cm x 22 cm
- Ensure that all numbers, letters, and symbols are no smaller than 6 points (2 mm) and no larger than 12 points (6 mm) after reduction. Keep text sizing consistent within each graphic.
- Preassemble all composite figures.
- Submit images in these file formats: TIFF, EPS, PDF, or PPT.
- Submit 3D images as either PRC or U3D. For each 3D image, include a 2D representation in TIFF, EPS, or PDF format.



## Figure legends

Include figure legends immediately after referencing the figure in the manuscript. Ensure that figure legends adhere to the following guidelines:

- For figures with multiple panels, the first sentence of the legend should be a brief overview of the entire figure. Explicitly reference and describe each panel at least once in the figure legend.
- Include clearly labeled error bars in all graphs and describe them in the figure legend.
- State whether a number that follows the  $\pm$  sign is a standard error (SEM) or a standard deviation (SD).
- When applicable, provide the *P* value, magnification, or scale bar information.
- Indicate the number of independent data points (*N*) represented in a graph in the legend.
- Ensure that numerical axes on all graphs go to 0, except for log axes.

## Tables

- Ensure that the table is in an editable Word, RTF, or LaTeX format.
- Include a brief title (above) and footnotes (below) the table.
- Avoid multipart tables (Table 1A, Table 1B).

	Raster	Vector
Definition	Images composed of pixels (also called “bit-mapped” or “pixelmapped” images). Use for non-line art images, e.g., scanned artwork, digital photographs, complex imagery, and color effects such as blended colors, shading, shadows, and gradients.	Images composed of paths (points, lines, and curves) that are created with mathematical formulas. Use for line art images, e.g., graphs, polygons, logos, illustrations, circles, and ellipses, all predominantly composed of solid colors with sharp lines and contrasts.
Sample	 <ul style="list-style-type: none"> <li>• Notice pixelation and blurriness of numbers, and jagged edges of lines. For details, magnify image by using zoom function.</li> </ul>	 <ul style="list-style-type: none"> <li>• Notice continuous smooth paths of numbers and lines. For details, magnify image by using zoom function.</li> </ul>
Resolution	<ul style="list-style-type: none"> <li>• Graphics are resolution dependent; scaling to different sizes results in quality loss.</li> <li>• Images with large dimensions will maintain large file sizes.</li> </ul>	<ul style="list-style-type: none"> <li>• Graphics are <b>not</b> resolution dependent; they can be scaled to any size without quality loss.</li> <li>• Images with large dimensions will maintain smaller file sizes.</li> </ul>
File types	<ul style="list-style-type: none"> <li>• JPGs, GIFs, TIFs, and EPSs/PDFs originating from raster programs.</li> <li>• Common programs: Adobe Photoshop, Corel Painter, SketchBook Pro, and GIMP.</li> </ul>	<ul style="list-style-type: none"> <li>• AIs and PPTs/EPSs/PDFs originating from vector programs.</li> <li>• Common programs: Adobe Illustrator, Corel DRAW, Sketch, PowerPoint, and Canva.</li> </ul>
Requirements & Tips	<ul style="list-style-type: none"> <li>• 300 <b>ppi</b> for grayscale or color images with no type or lettering, 600–900 <b>ppi</b> for grayscale or color images with type, and 1000–1200 <b>ppi</b> for line art, e.g., bar graphs.</li> <li>• Color mode should be RGB.</li> <li>• Avoid creating text in graphics.</li> <li>• Raster-based files can have low resolution in the published article, as they cannot be altered in size without losing quality.</li> </ul>	<ul style="list-style-type: none"> <li>• 300 <b>dpi</b> for grayscale or color images with no type or lettering, 600–900 <b>dpi</b> for grayscale or color images with type, and 1000–1200 <b>dpi</b> for line art, e.g., bar graphs.</li> <li>• Color mode should be RGB.</li> <li>• Best for creating text in graphics.</li> <li>• Vector-based files provide maximum flexibility for sizing your figures, as they can be altered in size while maintaining high-quality resolution.</li> </ul>

## References

References must be in PNAS style and numbered in the order they appear in the text. Unpublished abstracts presented at meetings or references to “data not shown” are not permitted. If necessary to reference a retracted article, include an explanation for doing so and cite the retraction notice rather than the original publication.

Cite references in numerical order as they appear in text, and include all references cited in the main text in the main manuscript file. Include a separate citation list for references cited in the SI. Tables and figures will be inserted in the text where first cited; number references in these sections accordingly.

- Include the full title for each cited article. Use MEDLINE/PubMed abbreviations of journal titles or use the full journal title for any journals not indexed in MEDLINE.
- If there are more than five authors, list the first author’s name followed by et al.
- Provide volume numbers for journal articles as applicable; provide DOI numbers if volume



numbers are not available.

- Provide page ranges for journal articles and book chapters.
- Provide date of access for online sources.
- If an article has been accepted for publication but is not yet published, note in-press status and include a DOI number when possible.

Source	Example
Journal articles	10. J.-M. Neuhaus, L. Sticher, F. Meins Jr., T. Boller, A short C-terminal sequence is necessary and sufficient for the targeting of chitinases to the plant vacuole. <i>Proc. Natl. Acad. Sci. U.S.A.</i> <b>88</b> , 10362–10366 (1991). C. Corsello <i>et al.</i> , <i>FOXP1</i> -related intellectual disability syndrome: A recognizable entity. <i>J. Med. Genet.</i> , in press.
Research datasets	12. E. van Sebille, M. Doblin, Data from “Drift in ocean currents impacts inter-generational microbial exposure to temperature.” Figshare. Available at <a href="https://dx.doi.org/10.6084/m9.figshare.3178534.v2">https://dx.doi.org/10.6084/m9.figshare.3178534.v2</a> . Deposited 15 April 2016.
Articles or chapters in books	14. A. V. S. Hill, “HLA associations with malaria in Africa: Some implications for MHC evolution” in <i>Molecular Evolution of the Major Histocompatibility Complex</i> , J. Klein, D. Klein, Eds. (Springer, 1991), pp. 403–420.
Preprints	15. H. Luetkens <i>et al.</i> , Electronic phase diagram of the LaO <sub>1-x</sub> F <sub>x</sub> FeAs superconductor. arXiv [Preprint] (2008). <a href="https://arxiv.org/abs/0806.3533">https://arxiv.org/abs/0806.3533</a> (accessed 6 November 2020).
Archived code	2. C. Reynaud <i>et al.</i> , Tomography. Zenodo. <a href="https://doi.org/10.5281/zenodo.3712368">https://doi.org/10.5281/zenodo.3712368</a> . Deposited 15 July 2020.
Conference proceedings	7. C. Trepo, “Modelization of the epidemic” in <i>Proceedings of the Twelfth International Symposium on Viral Hepatitis and Liver Disease</i> , H. Alter, J. Maynard, W. Szmunes, Eds. (Franklin Institute Press, Philadelphia, PA, 2006), pp. 809–810.

## Supporting information

**SI will be published as provided by the authors; it will not be edited or composed.**

SI file formats:

- *SI Appendix*: Supply a single PDF file, combining all text, figures, tables, movie legends, and SI references. See the [PNAS SI template](#).
- *Datasets*: Supply XLSX, RTF, PDF, CSV, GZ, or TXT files.
- *Movies*: Supply AVI, MOV, WMV, GIF, or MPEG files at the desired reproduction size and length. Movies are limited to 10 MB in size. Include a brief legend for each movie in the SI Appendix.

When preparing SI files, please note the following:

- The main text of the paper must stand on its own without the SI.
- SI is referred to in the text and cannot be altered by authors after acceptance.
- Refer to the SI Appendix in the manuscript at an appropriate point in the text. Number supporting figures and tables starting with S1, S2, etc. References should be cited in numerical order as they appear in the SI; do not cite main-text references in the SI and vice versa.

If you choose to place detailed materials and methods in an SI Appendix, you must provide sufficient detail in the main-text methods to enable a reader to follow the logic of the procedures and results. The main article text also must reference the SI methods. If a paper is fundamentally a study of a new method or technique, then the methods must be described completely in the main text.

## Journal Cover Images

Authors are invited to submit scientifically interesting and visually arresting images to be considered for our cover (see our [archive](#)). Illustrations need not appear in the article but should

be representative of the work. Images should be original, and authors must grant PNAS a License to Publish.

To submit an image for consideration for the PNAS cover:

- Submit the image with your manuscript through the PNAS manuscript submissions system, or email the image to [PNASCovers@nas.edu](mailto:PNASCovers@nas.edu). Contact PNAS for instructions on submitting large files.
- Include a brief lay-language caption (50–60 words) and credit information (e.g., Image credit:...).
- Submit an image that is 21 cm wide by 22.5 cm high.
- Submit the file in EPS or TIFF format and use RGB color mode.

The deadline for cover submissions is when your proof corrections are returned. If you choose to submit an image outside the online submission system, make sure you include the manuscript number, author name, phone, and email in your submission.

## Submissions Contributed by NAS Members

NAS members may contribute up to two research manuscripts annually, which must be within the member's area of expertise and in which the member had a direct, significant role in the design and execution of the work. The final version of the manuscript must be submitted by the last day of the year to count toward that year's annual limit.

The submissions and peer review process for Contributed manuscripts are described below. All authors, including NAS member authors submitting their work through the Contributed track, must adhere to [PNAS editorial policies and guidelines](#).

### Peer Review Process

#### Tier 1: Initial screening by the Editorial Board

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All research reports, including those contributed by an NAS member, must be peer reviewed by at least two independent experts in a process overseen by a member of the Editorial Board. The contributing member submits the manuscript to PNAS along with the names of at least two experts in the field of the paper who have agreed to review the work and brief comments about why each of those reviewers was chosen. A member of the Editorial Board evaluates the appropriateness of the submission for PNAS, determines whether the work is in the member's direct area of expertise, and considers whether the reviewers selected by the authors have the necessary expertise to evaluate the manuscript. Submissions may be declined or alternative reviewers may be suggested at the discretion of the Editorial Board member.

#### Tier 2: Independent peer review

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The Editorial Office sends the manuscript to the assigned reviewers and to others who may be selected by the Editorial Board member, manages the review process, and collects the reviewer reports. When the reviews are completed, the contributing member works with his or her coauthors to revise the manuscript in response to the reviewers' comments. The revised manuscript and a point-by-point response are returned to the reviewers to ensure that their concerns have been adequately addressed.

#### Tier 3: Final evaluation by the Editorial Board

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The responsible member of the Editorial Board reviews the final version of the member's manuscript, along with all rounds of reviewers' comments and the authors' point-by-point responses. Only when the assigned Board member is satisfied that the work has been appropriately reviewed and is suitable for PNAS will the manuscript be accepted. The name of the NAS member responsible for contributing the article, along with the names of the reviewers, will appear below the author affiliation line on the title page of the published paper.

## Authorship

For Contributed submissions, the NAS member acts as the corresponding author during the review process and must be listed as a corresponding author on the published article. After completion of the review process, a coauthor may be designated to serve as a co-corresponding author.

## Competing Interests

Academy members who have a competing interest, financial or otherwise, that could be seen as significantly impairing their objectivity or as creating an unfair competitive advantage for any person or organization tied to the research should submit their work as a Direct Submission. See [Editorial and Journal Policies](#) for further information.

## Initial Submissions

As with Direct Submissions, Contributed submissions must include the following four items:

1. A manuscript file (in any format) including the following:
  - Title page (title, author list, classification, keywords)
  - Abstract
  - Significance statement
  - Main text
  - References
  - Figures or tables with appropriate legends (may be uploaded separately)
  - SI files (may be uploaded separately)
2. Contact and competing interest information for all authors
3. Data sharing plans (for all data, documentation, and code used in analysis)
4. Funding information and whether immediate open access has been selected

In addition to these four items, as noted above, Contributed submissions must include the names of at least two experts in relevant subject areas (particularly for multidisciplinary studies) who have agreed to review the manuscript. **The names and institutional affiliations of all reviewers of Contributed articles are published in a footnote.** These experts must:

- be from different institutions (from the authors and each other),
- not have collaborated with the authors in the past 48 months, and
- be free of any other [competing interests](#).

Visit [Submitting your Manuscript](#) for full instructions on submissions and manuscript formatting.

## Editorial and Journal Policies

The standard mode of submitting manuscripts to PNAS is Direct Submission; manuscripts may be submitted directly to PNAS—authors do not need to first obtain an NAS member’s agreement to serve as an editor. In submitting to PNAS, all authors must agree to abide by PNAS editorial and journal policies. Manuscripts are reviewed with the explicit understanding that all authors have seen and approved of the submitted version.

## Peer Review Process

### Tier 1: Editorial Board assessment

The PNAS Editorial Board is made up of NAS members who are active scientists and experts in their fields. On submission, your paper is assigned to an Editorial Board member in one of the 31 NAS disciplines. If the Board member determines that the paper should proceed further, she or he assigns it to a member editor or, if the NAS membership lacks sufficient expertise, to a nonmember guest editor to oversee the peer review process. The Board may reject manuscripts without further review, or review and reject manuscripts that do not meet PNAS standards. More than 50% of submissions are declined at initial evaluation.

## Tier 2: Member editor or Guest editor assessment

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