JATS Supports Modern Publishing and Open Science

JATS was designed for journal publishing as practiced *in the early 2000's*. JATS now supports both open science and modern publishing practice with the extensive metadata and features described below.

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Publish Preprints/Article Versions/Articles Not Part of an Issue

What: Publishing preprints was rare in 2000. Now putting preprints online before/during peer review is common, and posting individually-published or multiply-revised articles is the norm in many fields.

How:

Record a version/lifecycle statement: An <article-version> element names a version as: a word from a controlled version vocabulary ('Proof' from the NISO JAV recommendation), a non-JAV version status word ('draft' or 'revised proof'), a version statement ('Second revised print version'), or a publisher's version number ('385R5' or 'ver. 2.0')

```
<article-version vocab="JAV"
  vocab-identifier=
  "http://www.niso.org/publications/rp/RP-8-2008.pdf"
  article-version-type="AO"
  vocab-term="Author's Original"
  specific-use="ArXiv preprint"
  iso-8610-date="2019-05-19"
>preprint</article-version>
```

Record version in more than one system: An article may have only one version number in any one system, but may record additional identifiers in other systems using element <article-version-alternatives>

Point to other versions of the same article: Use <related-article> to point to preprint, revised proof, published in an issue, Version of Record, etc.

Provide multiple publication dates: Element <pub-date> is repeatable to name different 'types' of publication. Flag element <pub-date-not-available> may be used if there is no formal publication date

If article was not published in a volume or issue:

Metadata describing volume and issue is always optional <elocation-id> supplies an alternative to page numbers for born-digital articles <article-version> can describe a specific version

Provide a description of a lifecycle event using <event>:

Describes a pre- or post-publication event including an article version statement, dates, link(s), copyright information, and/or descriptive commentary

May describe posting on a preprint server, acceptance and publication as part of an issue, reprinting or publishing a revised online edition, etc.

Cite Data You Generated or Used

What: The Force11 *Joint Declaration of Data Citation Principles* recommends that *data* be considered as legitimate, citable objects of research, equivalent to articles and books. The JATS Standing Committee worked with Force11 to establish techniques for citing data in JATS. Data is cited using the ordinary citation elements <mixed-citation> or <element-citation>.

Where:

<ref-list> is allowed to repeat, so data citations may be cited in the same reference list as publications or in their own separate reference list

Citations are also allowed inside paragraphs (<p>) and titles (<title>)

How:

Flag the citation as a data citation: On <mixed-citation> or <element-citation> element:

Set @publication-type attribute to 'data'

Describe the data use case with @use-type attribute values:

'generated-data', 'analyzed-data', or 'non-analyzed-data'

Name your data source: Record the data source name (or multiple hierarchical levels of names) using one or more <data-title> and <source> elements

Provide persistent identifier(s): Name a unique identifier for the data source (such as a DOI or URI) using <ext-link> or as a <pub-id>

Name the version: Provide a version number or statement (using the <version> element) that tells which version of the source was cited

Use other inside-citation elements: Record other metadata such as: names of contributors (<person-group>); publication dates (<year>, <month>, <day>); access-date and time (<date-in-citation>); and more using the full power of a JATS citation

Example

```
<ref-list>…
<ref>
<mixed-citation
  publication-type="data"
  use-type="analyzed-data">
<data-title>Homo sapiens cAMP responsive element
binding protein 1 (CREB1), transcript variant A,
mRNA.  <source>GenBank</source>
<ext-link ext-link-type="genbank"
xlink:href="NM_004379.3">NM_004379.3</ext-link>.
</mixed-citation>
</ref></ref-list>
```

Link to Taxonomies/Ontologies

What: JATS can specific semantics by identifying the taxonomy or ontology source for a term, for example, CRediT-defined contributor roles, INSPEC keywords, MESH subjects, and funding sources named in the Open Funder Registry

Four vocabulary attributes identify JATS elements as coming from a controlled vocabulary such as a taxonomy, ontology, term list, thesaurus, lexicon, database, code list, index, or similar:

@vocab: Names the vocabulary that is the source of the term
(For a controlled vocabulary: IPC Codes ['ipc'] or MESH headings ['mesh']. For an uncontrolled vocabulary, an area of study ['medical-devices'] or an uncontrolled source ['author'].)

@vocab-identifier: Points to the vocabulary, using a URI, DOI, or other unique identifier
(E.g., for Dublin Core (DCC), the identifier http://dublincore.org/documents/2012/06/14/dces/; for the CRediT Taxonomy, the identifier https://dictionary.casrai.org/Contributor_Roles.)

@vocab-term: Holds the canonical version of the term, as it appears in the vocabulary
(The content of the element is the *display version* of the term. If the @vocab-term value is 'digitized-vor', the element might contain the display text 'Digitized Version of Record'.)

@vocab-term-identifier: Points to the specific term within the given vocabulary, using an item number, URI, DOI, or similar

Where used:

- Terms in any context (<term>)
- Keyword elements (<kwd-group>, <kwd>, <compound-kwd>, <nested-kwd>)
- Subject elements (<subj-group>, <subject>, <compound-subject>)
- Author/Contributor roles (<role>)
- Institution identifiers (<institution-id>)
- Article version numbers or statements (<article-version>)
- Resource identifiers used in describing funding (<resource-id>)
- Terms you identified in the text (<named-content>)

Examples

CRediT contributor roles

```
<contrib>
  <string-name>
    <given-names>Barbara S.</given-names>
    <surname>Johnston</surname></string-name>
  <role degree-contribution="lead"
    vocab="CRediT"
    vocab-identifier=
      "http://dictionary.casrai.org/Contributor_Roles"
    vocab-term="Conceptualization"
    vocab-term-identifier=
  "http://dictionary.casrai.org/Contributor_Roles/Conceptualization"
  >study designer</role>
</contrib>
```

Compound Keywords

```
<kwd-group
    kwd-group-type="library-classifications">
  <compound-kwd  vocab="LOC"
      vocab-term=
        "Diseases of the respiratory system"
      vocab-term-identifier="RC705-779">
    <compound-kwd-part
    >RC705-779</compound-kwd-part>
    <compound-kwd-part>Diseases of the
      respiratory system</compound-kwd-part>
  </compound-kwd>

  <compound-kwd  vocab="Dewey Decimal"
      vocab-term="Diseases of the respiratory
      system"
      vocab-term-identifier="616.3">
    <compound-kwd-part>616.3</compound-kwd-part>
    <compound-kwd-part>Diseases of the
      respiratory system</compound-kwd-part>
  </compound-kwd>
</kwd-group>
```

ALI Free to Read (Supports Open Science)

<ali:free_to_read> is a flag inside <permissions> to indicate that the document content can be read or viewed at its current location *by any user without payment or authentication*. This element was defined in *NISO RP-22-2015 Access License and Indicators* Recommended Practice. Attributes @start_date and @end_date record delayed access or embargo periods.

```
<permissions>...
  <ali:free_to_read
    xmlns:ali="http://www.niso.org/schemas/ali/1.0/"
    start_date="2019-01-01"
    end_date="2019-12-31"/>
</permissions>
```

Identify Authors/Contributors

What: Repeatable <contrib-id> element holds an external identifier (ORCID, JST identifier, arXiv identifier, Scopus identifier) for a person such as a contributor (author, editor, data curator, photographer, etc.); principal investigator; or principal award recipient. Disambiguates authors for credit, discovery, funding tracking, etc.

How: Element <contrib-id> used in: <contrib>, <principal-award-recipient>, <principal-investigator>

Attribute @contrib-id-type names the *type of identifier*, such as an ORCID, JST identifier, arXiv identifier, Scopus identifier, or a publisher's identifier

Attribute @assigning-authority names the organization or system that assigns or administers the identifier, such as Scopus

Attribute @authenticated says if the ID is authenticated ('yes' or 'no')

Example

```
<contrib>
  <contrib-id
      contrib-id-type="orcid"
      authenticated="true"
  >http://orcid.org/0000-0002-1825-0097</contrib-id>
  <contrib-id
      contrib-id-type="scopus-id"
      assigning-authority="scopus"
  >7007156898</contrib-id>
  <name><surname>Carberry</surname>
    <given-names>Josiah Stinkney</given-names>
  </name>
</contrib>
```

Record Specific Roles for Contributors

What: In these days of hundreds of authors for some articles, it is increasing important, to record *what kind* of contribution was made and how major that role was. For example, a contributor may help perform the research, gather the data, analyze the data, write the article, create data visualization, or play a supervisory role in the research.

How: The <role> element describes the participation of a contributor to the research and/or the article, for example, 'writer', 'study designer', 'chief scientist', 'managing director', 'photographer', 'deep-sea diver', 'genome sequencer', 'veterinarian', 'protocol reviewer', etc.

Multiple roles: A single contributor make perform many <role>s

Level of contribution: Attribute @degree-contribution indicates the level of contribution for this contributor, such as 'lead', 'supporting', or 'equal'

CRediT (and other) vocabularies: If <role> is a term from a controlled vocabulary/ontology/taxonomy, the vocabulary attributes can record that source. The CRediT (Contributor Roles Taxonomy) Taxonomy defines the different contributor roles in research: https://dictionary.casrai.org/Contributor_Roles

Where: Roles may be recorded for:

Primary contributors (<contrib>, <contrib-group>, <collab>)

Cited contributors (<person-group>, <collab> within a citation)

Contributors of described materials, such as <product>, <related-article>, or <related-object> (with <name> and <string-name>)

Example

```
<contrib>
  <string-name><given-names>Barbara</given-names>
    <surname>Johnston</surname></string-name>
  <role degree-contribution="lead"
    vocab="CRediT"
    vocab-identifier=
    "http://dictionary.casrai.org/Contributor_Roles"
    vocab-term="Conceptualization"
    vocab-term-identifier=
  "http://dictionary.casrai.org/Contributor_Roles/Conceptualization">study designer</role>
</contrib>

<contrib>
  <string-name><given-names>Brooke</given-names>
    <surname>Jackson</surname></string-name>
  <role degree-contribution="lead"
    vocab="CRediT"
    vocab-identifier=
"http://dictionary.casrai.org/Contributor_Roles"
    vocab-term="Writing &#8212; Original Draft"
    vocab-term-identifier=
"http://dictionary.casrai.org/Contributor_Roles/Writing_%E2%80%93_original_draft"
  >author</role>
</contrib>
```