Life Science Person Specification 0.1

*A specification for describing people in life sciences*

# **Recommendation [DAY] [MONTH] 2015**

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# **Abstract**

The Life Science Person specification provides a way to describe bioscience events on the World Wide Web. It defines a set of metadata and vocabularies, built on top of existing technologies and standards, that can be used to represent the profile information of people in Web pages and applications. The goal of the specification is to make it easier to discover, life science profile information.

# **Status of this Document**

This specification is under development. The work proposed in this document builds on top of previous meetings and discussions involving organisations such as [GOBLET](http://mygoblet.org), [ISCB](http://www.iscb.org), [ELIXIR](https://www.elixir-europe.org), [SIB](https://www.isb-sib.ch), and the [Pistoia Alliance](http://www.pistoiaalliance.org).

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# **Introduction**

## **Problem statement**

There is a wealth of descriptive information about people distributed across the web. Within the life science community, profiles of people can be found on institutional pages, project pages, community sites, repositories, and wikis amongst other online resources. These profiles often contain assortments of facts about people and their relationships to organizations and projects, such as biographic text, curriculum vitaes, positions held, roles, expertise, contact information, education, or photographs. Due to the heterogeneous nature of web pages and the differences in the terms used to describe profile information; search engines face difficulties interpreting profile pages to usefully expose facts in search results. For profiles of people in life sciences, there is also a lack of agreement on a common controlled vocabulary to define people’s skill and expertise.

## **Proposed solution**

### **Rationale**

In the development of the Life Science Person standard we have considered the following design goals.

#### *Consensus*

Many organisations and repositories providing profile information already exist. It is important this standard takes into account their experience and contribution.

#### *Adoption*

Many organisations already have a website or system providing information about profiles. They will not be willing to change their methods unless there is a clear benefit and a low barrier for adoption.

#### *Reuse*

There are existing formats suitable to represent at least some information about Life Science people. This specification will avoid reinvention and seek to extend existing standards. We propose enhancements to the Person schema (<https://schema.org/Person>), and propose a LifeSciencePerson schema that inherits from Person for fields too specific to be included in the broader Person.

### **Goals**

The Life Science Person specification aims to support the description, discoverability, exchange and aggregation of scattered profiles of people in the life science domain by working with the community to define:

· a data model,

· a minimum information guideline,

· controlled vocabularies, and

· tools.

The specification is designed to be unintrusive to profile providers, minimising changes to the methods organisations currently use to present people information. It aims to facilitate adoption by extending existing standards. The definition and classification of fields in the data model makes use of standard specifications from Schema.org, and dissemination of information is facilitated by making use of standards like Microdata, JSON-LD and RDFa. Fields that require controlled vocabularies will specify existing ontologies where possible.

### **Scope**

The document is intended for profile providers and software developers working on projects that need to present or aggregate profiles.

# **Data model**

The data model is based on the standards set out in Schema.org. [Schema.org](http://schema.org/) is a collaborative, community-driven project with a mission to create, maintain and promote schemas (types) for structured data on the Internet. These types (like Event, Person, Book) provide a standard for creating semantic markup in web pages and applications.

Schema.org markup covers entities, relationships between entities and actions, and can easily be extended through a well-defined extension model. Over 10 million sites already use Schema.org to code their web pages, email messages, etc. Many applications from Google, Microsoft, Pinterest, Yandex and others also use Schema.org types.

The data model proposed involves:

1. **Adopting the Schema.org Person type, and extending it with additional properties**. Schema.org has a way of describing people through its [Person](https://schema.org/Person) schema. In this document we recommend online providers of Life Science profiles use this schema to describe people. The Person schema does not have properties for several necessary fields to describe life scientists. In order to avoid duplication of efforts by creating a new schema, we propose amendments to the Person schema type to. If the community agrees, these additional properties will be put forward for adoption to Schema.org.
2. **Creating a new LifeSciencePerson type.**  After reviewing existing profile information for life scientists across the web we have found several attributes that specifically pertain to life scientists which cannot be incorporated into the generic Person schema. As such we propose a new Schema.org type called LifeSciencePerson which will be an extension of the Person schema that describes several life science specific related properties.
3. **Adopting a standard way of using the Schema.org Person type.** Many properties in the Schema.org Person type are loosely defined, and we propose guidelines on how to use them so that they are more specific and consistent.These guidelines include concepts not supported by Schema.org, such as cardinality, controlled vocabularies and content guidelines (minimum, optional and recommended fields). For example, we suggest the use of a controlled vocabulary based on the EDAM ontology for the ‘expertise’ property. These recommendations will not be part of the Schema.org Person type, but are proposed as best practices in using that type in life science.

In the table below, the newly proposed LifeSciencePerson properties are listed first, followed by the proposed amendments to the Person schema, and finally the existing Person schemas properties are listed. The research behind these new properties has been compiled into a [Google spreadsheet](https://docs.google.com/spreadsheets/d/1_Hc_RD0GvdxuuO921ZGoQGZEFkcEjcS5J6dQVD2cwiQ/edit?usp=sharing)

## **LifeSciencePerson type definition**

### **Data fields**

Legend:

*CN: Cardinality (one, many)*

*CG: Content Guideline (M: minimum; R: recommended; O: optional)*

*CV: Controlled Vocabulary*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Title | Property | Expected Type | Description | CN | CG | CV |
| Properties from LifeScience[Person](https://schema.org/Person) | | | | | | |
| Funding | funding | Text | Textual description of current or past funding this person has acquired | many | O |  |
| International Activities | internationalActivity | Text | Global connections related to teaching and scholarly work in the past 3 years | many | O |  |
| Journal Referee | journalReferee | CreativeWork | Which journals this person is a referee of. | many | O |  |
| ORCID | orcid | Text or URL | The url or ID of the persons ORCID (see: http://orcid.org/) | one | R |  |

## 

## **Person type definition**

### **Data fields**

Legend:

*CN: Cardinality (one, many)*

*CG: Content Guideline (M: minimum; R: recommended; O: optional)*

*CV: Controlled Vocabulary*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Proposed Amendments to [Person](https://schema.org/Person) | | | | | | |
| Advisors | advisor | Person | A person who has been an educational, professional or personal advisor to the person. | many | O |  |
| Curriculum Vitae | curriculumVitae | Text or URL | A link or body of text describing the persons notable achievements, employment history, and contact details. | one | O |  |
| Experience | experience | Text | A textual description of the professional experiences a person has acquired. | many | O |  |
| Keywords | keyword | CV and/or Text | Keywords to describe the person. These should be single words or short phrases that relate to a person | many | R |  |
| Languages | language | Language | A list of languages spoken by the person | many | O |  |
| Interests | interest | CV and/or Text | Any interests held by the person. These should be single words or short phrases that relate to a person | many | O |  |
| Expertise | expertise | CV | A textual description of the topic which a person has the most expertise in. This should make use of an ontology such as the EDAM ontology | one | R |  |
| Works | works | CreativeWork or Text | All or notable publications, presentations, training materials, research outputs or any other body of work attributed to this person. | many | O |  |
| Properties from [Person](https://schema.org/Person) | | | | | | |
|  | [additionalName](https://schema.org/additionalName) | [Text](https://schema.org/Text) | An additional name for a Person, can be used for a middle name. |  |  |  |
|  | [address](https://schema.org/address) | [Text](https://schema.org/Text) or  [PostalAddress](https://schema.org/PostalAddress) | Physical address of the item. |  |  |  |
|  | [affiliation](https://schema.org/affiliation) | [Organization](https://schema.org/Organization) | An organization that this person is affiliated with. For example, a school/university, a club, or a team. |  |  |  |
|  | [alumniOf](https://schema.org/alumniOf) | [Organization](https://schema.org/Organization) or  [EducationalOrganization](https://schema.org/EducationalOrganization) | An organization that the person is an alumni of.  Inverse property: [alumni](https://schema.org/alumni). |  |  |  |
|  | [award](https://schema.org/award) | [Text](https://schema.org/Text) | An award won by or for this item. Supersedes [awards](https://schema.org/awards). |  |  |  |
|  | [birthDate](https://schema.org/birthDate) | [Date](https://schema.org/Date) | Date of birth. |  |  |  |
|  | [birthPlace](https://schema.org/birthPlace) | [Place](https://schema.org/Place) | The place where the person was born. |  |  |  |
|  | [brand](https://schema.org/brand) | [Brand](https://schema.org/Brand) or  [Organization](https://schema.org/Organization) | The brand(s) associated with a product or service, or the brand(s) maintained by an organization or business person. |  |  |  |
|  | [children](https://schema.org/children) | [Person](https://schema.org/Person) | A child of the person. |  |  |  |
|  | [colleague](https://schema.org/colleague) | [Person](https://schema.org/Person) | A colleague of the person. Supersedes [colleagues](https://schema.org/colleagues). |  |  |  |
|  | [contactPoint](https://schema.org/contactPoint) | [ContactPoint](https://schema.org/ContactPoint) | A contact point for a person or organization. Supersedes [contactPoints](https://schema.org/contactPoints). |  |  |  |
|  | [deathDate](https://schema.org/deathDate) | [Date](https://schema.org/Date) | Date of death. |  |  |  |
|  | [deathPlace](https://schema.org/deathPlace) | [Place](https://schema.org/Place) | The place where the person died. |  |  |  |
|  | [duns](https://schema.org/duns) | [Text](https://schema.org/Text) | The Dun & Bradstreet DUNS number for identifying an organization or business person. |  |  |  |
|  | [email](https://schema.org/email) | [Text](https://schema.org/Text) | Email address. | one | R |  |
|  | [familyName](https://schema.org/familyName) | [Text](https://schema.org/Text) | Family name. In the U.S., the last name of an Person. This can be used along with givenName instead of the name property. |  |  |  |
|  | [faxNumber](https://schema.org/faxNumber) | [Text](https://schema.org/Text) | The fax number. |  |  |  |
|  | [follows](https://schema.org/follows) | [Person](https://schema.org/Person) | The most generic uni-directional social relation. |  |  |  |
|  | [gender](https://schema.org/gender) | [Text](https://schema.org/Text) | Gender of the person. |  |  |  |
|  | [givenName](https://schema.org/givenName) | [Text](https://schema.org/Text) | Given name. In the U.S., the first name of a Person. This can be used along with familyName instead of the name property. |  |  |  |
|  | [globalLocationNumber](https://schema.org/globalLocationNumber) | [Text](https://schema.org/Text) | The [Global Location Number](http://www.gs1.org/gln) (GLN, sometimes also referred to as International Location Number or ILN) of the respective organization, person, or place. The GLN is a 13-digit number used to identify parties and physical locations. |  |  |  |
|  | [hasOfferCatalog](https://schema.org/hasOfferCatalog) | [OfferCatalog](https://schema.org/OfferCatalog) | Indicates an OfferCatalog listing for this Organization, Person, or Service. |  |  |  |
|  | [hasPOS](https://schema.org/hasPOS) | [Place](https://schema.org/Place) | Points-of-Sales operated by the organization or person. |  |  |  |
|  | [height](https://schema.org/height) | [QuantitativeValue](https://schema.org/QuantitativeValue) or  [Distance](https://schema.org/Distance) | The height of the item. |  |  |  |
|  | [homeLocation](https://schema.org/homeLocation) | [Place](https://schema.org/Place) or  [ContactPoint](https://schema.org/ContactPoint) | A contact location for a person's residence. | one | R |  |
|  | [honorificPrefix](https://schema.org/honorificPrefix) | [Text](https://schema.org/Text) | An honorific prefix preceding a Person's name such as Dr/Mrs/Mr. |  |  |  |
|  | [honorificSuffix](https://schema.org/honorificSuffix) | [Text](https://schema.org/Text) | An honorific suffix preceding a Person's name such as M.D. /PhD/MSCSW. |  |  |  |
|  | [isicV4](https://schema.org/isicV4) | [Text](https://schema.org/Text) | The International Standard of Industrial Classification of All Economic Activities (ISIC), Revision 4 code for a particular organization, business person, or place. |  |  |  |
|  | [jobTitle](https://schema.org/jobTitle) | [Text](https://schema.org/Text) | The job title of the person (for example, Financial Manager). |  |  |  |
|  | [knows](https://schema.org/knows) | [Person](https://schema.org/Person) | The most generic bi-directional social/work relation. |  |  |  |
|  | [makesOffer](https://schema.org/makesOffer) | [Offer](https://schema.org/Offer) | A pointer to products or services offered by the organization or person.  Inverse property: [offeredBy](https://schema.org/offeredBy). |  |  |  |
|  | [memberOf](https://schema.org/memberOf) | [ProgramMembership](https://schema.org/ProgramMembership) or  [Organization](https://schema.org/Organization) | An Organization (or ProgramMembership) to which this Person or Organization belongs.  Inverse property: [member](https://schema.org/member). | many | R |  |
|  | [naics](https://schema.org/naics) | [Text](https://schema.org/Text) | The North American Industry Classification System (NAICS) code for a particular organization or business person. |  |  |  |
|  | [nationality](https://schema.org/nationality) | [Country](https://schema.org/Country) | Nationality of the person. |  |  |  |
|  | [netWorth](https://schema.org/netWorth) | [PriceSpecification](https://schema.org/PriceSpecification) | The total financial value of the person as calculated by subtracting assets from liabilities. |  |  |  |
|  | [owns](https://schema.org/owns) | [OwnershipInfo](https://schema.org/OwnershipInfo) or  [Product](https://schema.org/Product) | Products owned by the organization or person. |  |  |  |
|  | [parent](https://schema.org/parent) | [Person](https://schema.org/Person) | A parent of this person. Supersedes [parents](https://schema.org/parents). |  |  |  |
|  | [performerIn](https://schema.org/performerIn) | [Event](https://schema.org/Event) | Event that this person is a performer or participant in. |  |  |  |
|  | [relatedTo](https://schema.org/relatedTo) | [Person](https://schema.org/Person) | The most generic familial relation. |  |  |  |
|  | [seeks](https://schema.org/seeks) | [Demand](https://schema.org/Demand) | A pointer to products or services sought by the organization or person (demand). |  |  |  |
|  | [sibling](https://schema.org/sibling) | [Person](https://schema.org/Person) | A sibling of the person. Supersedes [siblings](https://schema.org/siblings). |  |  |  |
|  | [spouse](https://schema.org/spouse) | [Person](https://schema.org/Person) | The person's spouse. |  |  |  |
|  | [taxID](https://schema.org/taxID) | [Text](https://schema.org/Text) | The Tax / Fiscal ID of the organization or person, e.g. the TIN in the US or the CIF/NIF in Spain. |  |  |  |
|  | [telephone](https://schema.org/telephone) | [Text](https://schema.org/Text) | The telephone number. |  |  |  |
|  | [vatID](https://schema.org/vatID) | [Text](https://schema.org/Text) | The Value-added Tax ID of the organization or person. |  |  |  |
|  | [weight](https://schema.org/weight) | [QuantitativeValue](https://schema.org/QuantitativeValue) | The weight of the product or person. |  |  |  |
|  | [workLocation](https://schema.org/workLocation) | [Place](https://schema.org/Place) or  [ContactPoint](https://schema.org/ContactPoint) | A contact location for a person's place of work. |  |  |  |
|  | [worksFor](https://schema.org/worksFor) | [Organization](https://schema.org/Organization) | Organizations that the person works for. |  |  |  |
| Properties inherited from [Thing](https://schema.org/Thing) | | | |  |  |  |
|  | [additionalType](https://schema.org/additionalType) | [URL](https://schema.org/URL) | An additional type for the item, typically used for adding more specific types from external vocabularies in microdata syntax. This is a relationship between something and a class that the thing is in. In RDFa syntax, it is better to use the native RDFa syntax - the 'typeof' attribute - for multiple types. Schema.org tools may have only weaker understanding of extra types, in particular those defined externally. |  |  |  |
|  | [alternateName](https://schema.org/alternateName) | [Text](https://schema.org/Text) | An alias for the item. |  |  |  |
|  | [description](https://schema.org/description) | [Text](https://schema.org/Text) | A short description of the item. | many | M |  |
|  | [image](https://schema.org/image) | [URL](https://schema.org/URL) or  [ImageObject](https://schema.org/ImageObject) | An image of the item. This can be a [URL](http://schema.org/URL) or a fully described [ImageObject](http://schema.org/ImageObject). | one | R |  |
|  | [mainEntityOfPage](https://schema.org/mainEntityOfPage) | [URL](https://schema.org/URL) or  [CreativeWork](https://schema.org/CreativeWork) | Indicates a page (or other CreativeWork) for which this thing is the main entity being described.  See [background notes](https://schema.org/docs/datamodel.html#mainEntityBackground) for details.  Inverse property: [mainEntity](https://schema.org/mainEntity). | many | R |  |
|  | [name](https://schema.org/name) | [Text](https://schema.org/Text) | The name of the item. | one | M |  |
|  | [potentialAction](https://schema.org/potentialAction) | [Action](https://schema.org/Action) | Indicates a potential Action, which describes an idealized action in which this thing would play an 'object' role. |  |  |  |
|  | [sameAs](https://schema.org/sameAs) | [URL](https://schema.org/URL) | URL of a reference Web page that unambiguously indicates the item's identity. E.g. the URL of the item's Wikipedia page, Freebase page, or official website. This can also be used to refer to social media handles such as Twitter, Facebook, Google plus, Researchgate |  |  |  |
|  | [url](https://schema.org/url) | [URL](https://schema.org/URL) | URL of the item. |  |  |  |

Here is an example snippet showing the attributes you can use on a LifeSciencePerson. For complete examples see the "Further examples" section at the end of this document.

|  |
| --- |
| Example 1. Attributes/properties of a LifeSciencePerson |
| <div itemscope itemtype="http://schema.org/LifeSciencePerson">  <div itemprop="name">John Smith</div>  <div itemprop="description">John Smith is specializes in Next Generation Sequencing at the University of Soandso. </div>  <div><meta itemprop="birthDate" content="1976-04-15T">Wednesday 14 April 1976</div>  ...  </div> |

### **Controlled Vocabularies (CV)**

Some data fields suggest the use of controlled vocabularies or enumerations. We will rely on existing vocabularies and ontologies wherever possible.

This section contains a list of fields that require or recommend use of controlled vocabulary terms or ontology terms, and specifies what is acceptable for each. The fields involved are:

* Expertise

*Should be* one, and only one, of the [EDAM Topic](http://edamontology.org/topic_0003) class values that reflect what this person has the most expertise in.

* Interest

*Can be* either an EDAM Topic, another ontology term, a free text value or a combination of three that describe the topics or domains that this person holds interest in.

* Keywords

*Can be* words, short phrases or ontology terms that in some way are associated with this person.

### **Content Guidelines (CG)**

To make it as easy as possible to implement a basic LifeSciencePerson model, we suggest a very small set of minimum (M) fields to include. For optimal discovery and integration we suggest some additional recommended (R) fields. All other fields are optional (O), but if included will enhance the user experience.

Fields that *must be* present (M) in order to comply with the specification are:

* name
* description

### **Cardinality**

The Schema.org specification permits any field to be included any number of times. Whether this is desirable depends on the context and intended use of the data. This specification includes suggestions as to the cardinality of selected fields, as indicated in the data model table above.

The table notates cardinalities in the following way:

|  |  |
| --- | --- |
| Notation | Definition |
| One | There may only be a maximum of one instance of this property type. For example, an event may only have a maximum of one start date. |
| Many | There can be multiple instances of this property type. For example, there may be more than one sponsor of an event. |

|  |
| --- |
| Example 2. Cardinality in LifeSciencePerson properties as microdata within HTML |
| <div itemscope itemtype="[http://schema.org/LifeSciencePerson](http://schema.org/LifeScienceEvent)">  ...  <div>Languages:  <span itemprop="language">English</span>,  <span itemprop="language">Spanish</span>  </div>  <div>ORCID: <meta itemprop="orcid"> <http://orcid.org/0000-0002-2627-0231></div>  ...  </div> |

*An example of a property type with multiple cardinality (eventType) and single cardinality (startDate).*

### **Identifiers**

TBD

## **Implementation Guidelines**

Schema.org [suggests](http://schema.org/docs/gs.html) implementing metadata, including the LifeSciencePerson specification, using Microdata, RDFa, or JSON-LD. Depending on the context, any of these can be used for embedding compliant event data in an event provider’s web pages or other online resources and services.

### **Microdata**

Microdata can be used for embedding properties from the specification directly into existing web pages and HTML tags to enrich event descriptions. This microdata can be extracted and further processed by search engines and other applications, but does not affect the ‘look and feel’ of the web page it is embedded in. Using microdata is the easiest method of implementing the specification, as it requires minimal intervention on event providers’ part. Example below depicts the use of microdata within HTML tags.

|  |
| --- |
| Example 3. Embedding LifeSciencePerson properties as microdata within HTML |
| <div itemscope itemtype="http://schema.org/LifeSciencePerson">  <div itemprop="name">John Smith</div>  <div itemprop="description">John Smith is specializes in Next Generation Sequencing at the University of Soandso.  </div>  <div>Birth Date: <meta itemprop="birthDate" content="1976-04-15T">Wednesday 14 April 1976</div>  ...  </div> |

For more information, please refer to the [Microdata Guide on Schema.org](https://schema.org/docs/gs.html).

### **RDFa**

[RDFa](https://en.wikipedia.org/wiki/RDFa) (or [Resource Description Framework](https://en.wikipedia.org/wiki/Resource_Description_Framework) in Attributes[[1]](https://en.wikipedia.org/wiki/RDFa#cite_note-n-1)) is a [W3C](https://en.wikipedia.org/wiki/W3C) Recommendation that adds a set of attribute-level extensions to [HTML](https://en.wikipedia.org/wiki/HTML), [XHTML](https://en.wikipedia.org/wiki/XHTML) and various XML-based document types for embedding rich [metadata](https://en.wikipedia.org/wiki/Metadata) within web documents. Example below explains the use of RDFa within HTML tags.

|  |
| --- |
| Example 4. Embedding LifeSciencePerson properties as RDFa within HTML |
| <div vocab="http://schema.org/" typeof="LifeSciencePerson">  <div property="name">John Smith</div>  <div property="description">John Smith is specializes in Next Generation Sequencing at the University of Soandso  </div>  <div>Birth Date: <meta property="birthDate" content="1976-04-15T">Wednesday 14 April 1976</div>  ...  </div> |

For more information, please refer to the [RDFa wiki](http://rdfa.info/).

### **JSON-LD**

[JSON-LD](https://en.wikipedia.org/wiki/JSON-LD) (JavaScript Object Notation for Linked Data), is a method of transporting [Linked Data](https://en.wikipedia.org/wiki/Linked_Data) using [JSON](https://en.wikipedia.org/wiki/JSON). Example below represents a LifeSciencePerson described in JSON-LD format.

|  |
| --- |
| Example 5. Representing LifeSciencePerson in JSON-LD format |
| <script type="application/ld+json">  {  "@context": "http://schema.org/",  "@type": "LifeSciencePerson",  "name": "John Smith",  "description": "John Smith is specializes in Next Generation Sequencing at the University of Soandso",  "birthDate": "1976-04-15T",  ...  }  </script> |

For more information, please refer to the [JSON-LD specification](http://www.w3.org/TR/json-ld/).

# **Glossary**

|  |  |
| --- | --- |
| Term | Definition |
| Ontology/Controlled vocabulary | For the purposes of this document the terms ontology and controlled vocabulary are interchangeable. [Wikipedia](https://en.wikipedia.org/wiki/Ontology_%28information_science%29) defines ontologies as:  *"In* [*computer science*](https://en.wikipedia.org/wiki/Computer_science) *and* [*information science*](https://en.wikipedia.org/wiki/Information_science)*, an ontology is a formal naming and definition of the types, properties, and interrelationships of the* [*entities*](https://en.wikipedia.org/wiki/Entities) *that really or fundamentally exist for a particular* [*domain of discourse*](https://en.wikipedia.org/wiki/Domain_of_discourse)*. It is thus a practical application of philosophical* [*ontology*](https://en.wikipedia.org/wiki/Ontology)*, with a* [*taxonomy*](https://en.wikipedia.org/wiki/Taxonomy_%28general%29)*."* |
| EDAM ontology | [EDAM ontology](http://edamontology.org/page) is one of the ontologies available in the life sciences domain, for classifying and describing bioinformatics operations, types of data, formats, and scientific topics. |
| EDAM ontology topic | EDAM ontology topics describe general bioinformatics subjects or categories, such as a field of study, data, processing, analysis or technology - starting from very general terms such as "biology" and "bioinformatics" to more specific ones such as "sequence analysis", "alignment", "sequencing", "microarrays", etc. |

# **Further examples**

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| Example 6. LifeSciencePerson containing all the recommended (R) fields |
| *Microdata:*  <div itemscope itemtype="[http://schema.org/LifeSciencePerson](http://schema.org/LifeScienceEvent)">  <div itemprop="name">John Smith</div>  <div itemprop="description">John Smith specializes in Next Generation Sequencing at the University of Soandso. </div>  <div itemprop="alternativeName">J.M. Smith</div>  <div itemprop="alternativeName">John M. Smith</div>  <div>Birth Date: <meta itemprop="birthDate" content="1976-04-15T">Wednesday 14 April 1976</div>  <div itemprop="email">j.smith@smithmail.com</div>  <div itemprop="workLocation" itemscope itemtype="<http://schema.org/Place>">  Location:  <span itemprop="name">University of Soandso</span>  <div itemprop="address" itemscope itemtype="http://schema.org/PostalAddress">  <span itemprop="streetAddress">6 Yellowbrick Road</span><br>  <span itemprop="addressLocality">Manchester</span><br>  <span itemprop="postalCode">M21 1RT</span><br>  <span itemprop="addressCountry">UK</span>  </div>  </div>  <div> ORCID:  <a itemprop="orcid" href="<http://orcid.org/0000-0002-2627-0231>">http://orcid.org/0000-0002-2627-0231</a>  </div>  <div>Expertise:  <span itemprop="expertise">Next Generation Sequencing</span>  </div>  <div>URL: <a itemprop="url" href="<http://jsmith.example.com>">http://jsmith.example.com</a></div>  <div>Keywords:  <span itemprop="keywords">NGS</span>  <span itemprop="keywords">Soandso</span>  </div>  <div itemprop="memberOf">  Affiliated with:  <div itemscope itemtype="<http://schema.org/Organization>">  <span itemprop="name">University of Soandso</span>  </div>  </div>  <a itemprop="sameAs" href="<https://twitter.com/johnsmith>">Twitter Account</a>  <a itemprop="sameAs" href="<https://www.researchgate.net/profile/John_Smith>">ResearchGate Profile</a>  <a itemprop="sameAs" href=<https://plus.google.com/u/0/+JohnSmith>>Google Plus Account</a>  </div>  *RDFa:*  <div vocab="http://schema.org/" typeof="LifeSciencePerson">  <div property="name">John Smith</div>  <div property="description">John Smith specializes in Next Generation Sequencing at the University of Soandso. </div>  <div property="alternativeName">J. M. Smith</div>  <div property="alternativeName">John M. Smith</div>  <div><meta property="birthDate" content="1976-04-15T">Wednesday 14 April 1976</div>  <div property="email">j.smith@smithmail.com</div>  <div property="workLocation" typeof="Place">  Location:  <span property="name">University of Soandso</span>  <div property="address" typeof="postalAddress">  <span property="streetAddress">6 Yellowbrick Road</span><br>  <span property="addressLocality">Manchester</span><br>  <span property="postalCode">M21 1RT</span><br>  <span property="addressCountry">UK</span>  </div>  </div>  <a property="orcid">http://orcid.org/0000-0002-2627-0231</a>  <div property="expertise">Next Generation Sequencing</div>  <div property="url">http://jsmith.example.com</div>  <div property="keywords">NGS</div>  <div property="keywords">Soandso</div>  <div property="memberOf" typeOf="Organization">  <span property="name">University of Soandso</span>  </div>  <a property="sameAs" href="<https://twitter.com/johnsmith>">Twitter Account</a>  <a property="sameAs" href="<https://www.researchgate.net/profile/John_Smith>">ResearchGate Profile</a>  <a property="sameAs" href=<https://plus.google.com/u/0/+JohnSmith>>Google Plus Account</a>  </div>  *JSON-LD:*  <script type="application/ld+json">  {  "@context": "http://schema.org",  "@type": "LifeSciencePerson",  "name": "John Smith",  "description": "fa",  "alternativeName": "J.M. Smith",  "alternativeName": "John M. Smith",  "birthDate": "1976-04-15T",  "email": "[j.smith@smithmail.com](mailto:j.smith@smithmail.com)",  "workLocation": {  "name": "University of Soandso",  "@type": "Place",  "address": {  "@type": "PostalAddress",  "streetAddress": "6 Yellowbrick Road",  "addressLocality": "Manchester",  "postalCode": "M21 1RT",  "addressCountry": "UK"  }  },  "orcid": "<http://orcid.org/0000-0002-2627-0231>",  "expertise": "Next Generation Sequencing",  "url": "<http://jsmith.example.com>",  "keyword": "NGS",  "keyword": "Soandso",  "memberOf": {  "@type": "Organization",  "name": "University of Soandso"  },  "image":"<https://raw.githubusercontent.com/plu/JPSimulatorHacks/master/Data/test.png>",  "sameAs":"<https://twitter.com/johnsmith>",  "sameAs":"<https://www.researchgate.net/profile/John_Smith>",  "sameAs":"<https://plus.google.com/u/0/+JohnSmith>"  }  </script> |
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| Example 7. Using the proposed new ontologyTerm type |
| Example of a keyword field using terms from different ontologies. In this case a term from EDAM, a term from MeSH and a custom term.  <div itemscope itemtype="[http://schema.org/LifeSciencePerson](http://schema.org/LifeScienceEvent)">  …  Keywords:  <div itemscope itemtype="<http://schema.org/ontologyTerm>">  <link itemprop="ontologyName" href="<http://purl.bioontology.org/ontology/EDAM>">  <meta itemprop="termId" content="data\_0006">  <span itemprop="termName">Metagenomics</span>  <div>,  <div itemscope itemtype="<http://schema.org/ontologyTerm>">  <link itemprop="ontologyName" href="https://www.nlm.nih.gov/mesh/">  <meta itemprop="termId" content="D056186">  <span itemprop="termName">Metagenomics</span>  <div>  <div itemscope itemtype="<http://schema.org/ontologyTerm>">  <meta itemprop="ontologyName" content="text">  <span itemprop="termName">Custom metagenomics term</span>  <div>  ...  </div> |