

## Institutional Repository

### Know-how of a decade in Managing Digital Assets

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**Abstract.** The advent of the Internet and the mushrooming of information in various digital formats have resulted in looking at the library and its services with newer perspectives for conserving and disseminating scholarly publications. This paper discusses two mechanisms of digitization initiated at Raman Research Institute (RRI) in India, namely 1) the Digital Repository of RRI and 2) the Imprints Collection. The digital repository of RRI is the institutional repository built in 2006 to bring visibility to the scholarly publications of its founder Sir C V Raman. This paper discusses a decade long experience in building and sustaining an institutional repository. A value addition to this repository is the "Imprints Collection"- a bio-bibliographic database of retired scientists of RRI. The design and functionality of the Imprints Collection are also discussed in this paper.

## 1 Introduction

Clifford Lynch defined Institutional Repository (IR) in 2003 as – "A set of services that an institute offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution."

An institutional repository philosophically has an open access approach, and they aim to show case the scholarly output of an Institute. Notionally they are a digital library, quite similar to analogous functions of a conventional library, performing tasks such as collecting, housing, classifying, cataloging, curating, preserving, and providing access to digital content of scholarly publications of an Institute. IR is relatively a new phenomenon initiated in early 21st century. Open access initiatives and the development of various software to encourage Open Archives Initiative has acted as a spring board for the growth of IR's across the globe.

Raman Research Institute (RRI) started in 1948 by Sir C V Raman is a pioneering research institute in Physics in India. Being an Institute started by a Noble Laureate, RRI library has a

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wealth of information resources such as scholarly publications of Raman and his students, and his correspondences with dignitaries from different walks of life, for example when India was undergoing socio-political turmoil. They represent the history of Indian science, and they have archival value. Most of the correspondences were hand written, and few were typed. Day by day and year after year, the papers holding these information were becoming fragile. RRI library also possessed many newspaper clippings reporting Raman's activities and his role in science policy soon after Indian independence in 1947. Handling newspaper clippings, which were in print format, was also becoming difficult. So, there was a need to preserve all of them for the future. The best option was to digitize, preserve and showcase Raman's publications and all the information resources associated with him through an IR. Subsequently, a decision was made to include scholarly publications of current research, photographs and audio/video files showcasing the diverse activities of the Institute.

## 2 Institutional Repository of RRI:

The institutional repository of the Raman Research Institute was initiated in 2004. The decision was made to use open repository software to build the IR. This was the time when many open source repository software was being developed and introduced in the market for free. RRI had three software options and they were:

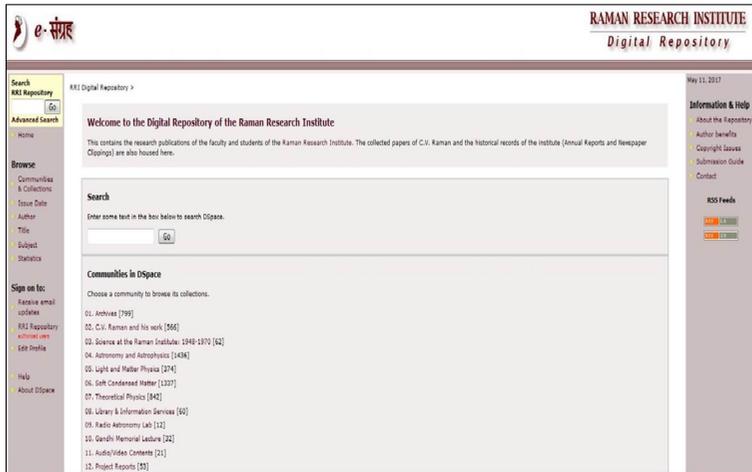
1. Greenstone by the New Zealand Digital Library Project at the University of Waikato, and developed and distributed in cooperation with UNESCO and the Human Info NGO
2. Eprints developed at the University of Southampton School of Electronics and Computer Science and
3. DSpace developed by MIT and HP Labs.

The decision was taken to install 'Eprints' and 'DSpace, ' and a test bed was created to identify the most suitable software for RRI. The final choice to build the repository was - "DSpace". The repository was named the "Raman Research Institute Digital Repository (RRIDR)." A dedicated server was used to install DSpace version 1.0.1. Different communities and sub-communities were identified for the classified submission of a variety of information on the repository. Dublin Core metadata standards were adopted to build the repository. Copyright is an important aspect while making submissions to the repository. SHERPA/ROMEO Publisher copyright policies and self-archiving guidelines were followed to handle copyright issues. The decision was taken to provide full-text access wherever permissible, and the rest were tagged as 'Restricted access,' thus protecting from copyright infringement. Self-submission guide for authors was written. The home page was customized.

Initially, the following seven communities were identified for submission:

- Archives
- C. V. Raman and his works
- Science at the Raman Institute 1948-1970
- Astronomy and astrophysics
- Light and matter physics
- Soft condensed matter
- Theoretical physics

It was realised during the process of digitisation that most of the materials were not born digital. So, they had to be scanned, cleaned, curated, digitized, classified and finally submitted and approved. RRIDR became operational in 2006 having 1406 records. In 2008, the repository was upgraded to version 1.5.1. The customized layout of the Repository is as in figure 1.

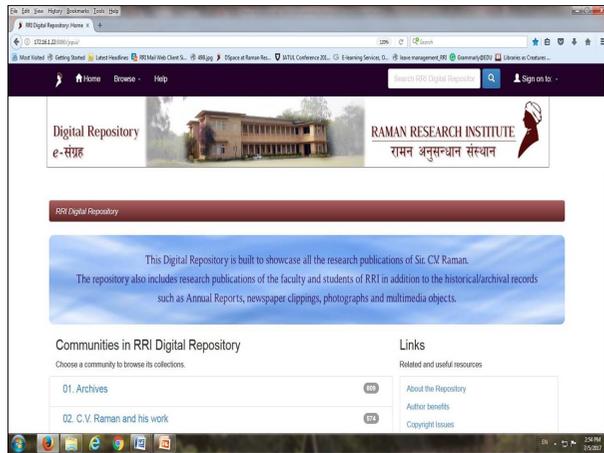


**Figure 1.** Raman Research Institute Digital Repository

The number of communities has steadily grown, and currently, there are 18 communities. The additional 11 communities are:

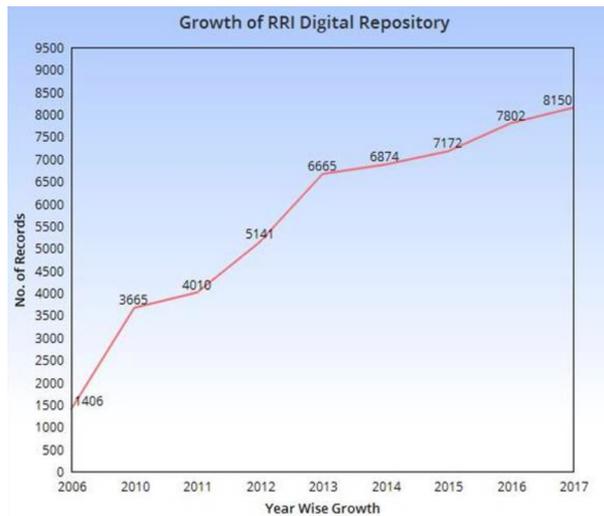
- Library and Information Services
- Electronics Engineering Group (EEG)
- Academic Events
- Gandhi Memorial Lecture
- RRI In-House Meeting
- Project Reports
- RRI Science News
- Audio/Video
- Photo Gallery
- Prof. Satish Dhawan's Collection
- Miscellaneous

Photographs, audio/video files were included as communities in 2011. Version 1.5.1 of DSpace did not have the feature of depicting thumb nail images of the photographs. So, searching a particular photograph was a difficult task. Video streaming was also not possible in the 1.5.1 version of DSpace. Video files had to be downloaded before viewing. This would test the patience of the users, mostly depending on the file size. Version 5.5 had additional helpful features to handle multimedia files. So in 2016, the repository was migrated to version 5.5 and subsequently to the current version 6.0 in 2017. The latest layout of RRIDR looks as it appears in figure 2.



**Figure 2.** New Layout of Raman Research Institute Digital Repository

RRIRDR has steadily grown, and the years growth of the uploaded records on the repository is graphically shown in Figure 3.



**Figure 3.** Growth of RRI Digital Repository

## 2.1 New features of DSpace version 6.0

The new version of the repository has certain additional helpful features and they are:

- High quality thumbnails available for image bitstreams and PDF bitstreams using Image Magick / Ghostscript.

- File downloads now can be tracked in Google Analytics
- Enhancements to DOI support is possible
- Video streaming option enabled
- Integrated with ORCID (Open Researcher and Contributor ID)
- Auto generation of PDF citation cover pages for all PDFs
- Sherpa/Romeo Guidelines (for copyright) is inbuilt and can be looked up during item submission
- Item visual indicators in browse and search results (Represented by an icon for Eg: Book chapter )

## **2.2 Challenges faced during Migration:**

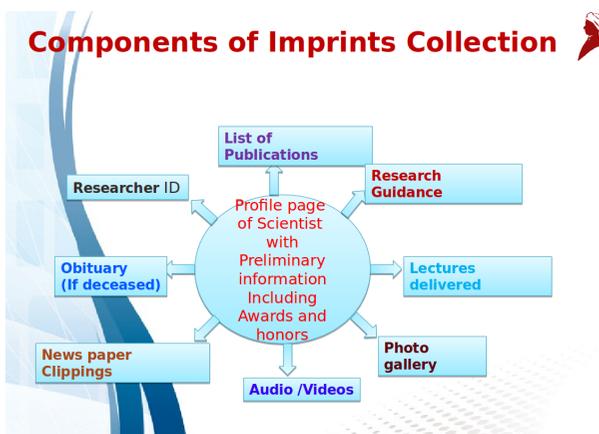
- As the data migration was from 1.5.1 to a much later version 5.5, the process was not smooth. Version 1.5.1 was installed in 2008 and Version 5.5 in 2016. In eight years there were many new developments in the software. So, special training was required along with lot of self study by two professionals (one from the Computer group and another from the Library group) for successful migration to the latest version.
- Customization was another area which created challenges. Version 1.5.1 used XML UI and in version 5.5, Bootstrap (JSPUI) is used for front end web framework. The new technology had to be learnt before implementation.
- Domain knowledge of both computer science and library science is essential for successful migration and implementation from version to version. So, this is a collaborative effort, which requires constant learning.

## **3 Imprints Collection – a Bio-bibliographic database**

Imprints collection is the name of a bio-bibliographic database of all the retired scientists from the Raman Research Institute who have made one or more contributions to the world of scientific literature. This is designed to honor and archive the lifelong efforts of RRI scientists in science promotion and science communication. The Imprints collection, as a database, captures various activities of scientists which include their publications, research guidance, lectures delivered, education, scientific career, awards and honors received etc. Additionally, the database has a photo gallery, ResearcherID badge from Thomson Reuters, newspaper clippings and audio/video (if available) files in the well-designed profile page of each scientist.

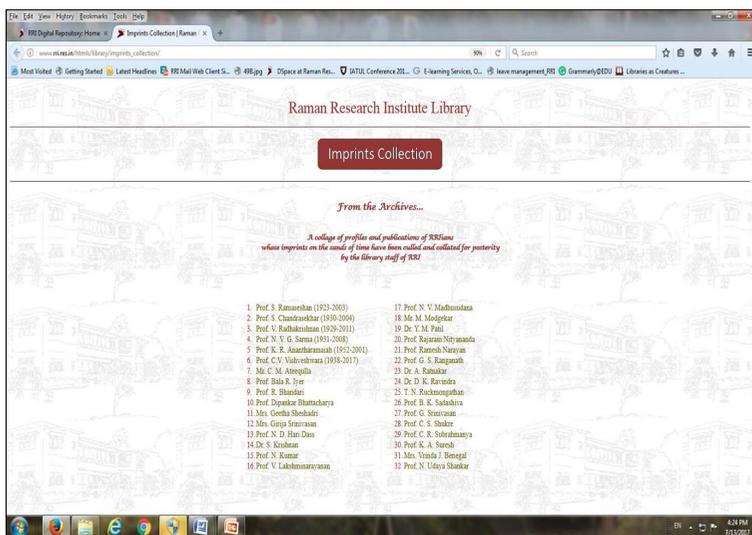
### **3.1 Design of Imprints collection**

This web based information retrieval platform for scholarly communication was designed in 2011 using Dreamweaver software. Base line for building the Imprints collection is the RRI Digital Repository. A profile page for each scientist is built giving primary information such as name of his/her parents, place of birth, primary education, higher education, careers, fellowship or association with any professional bodies, information about any awards and honors that are conferred during their career. Further, the profile page gets linked to their list of publications, list of research guidance that they have done, photographs of their association with RRI, any news items that appeared in newspapers, and their audio/video file. In the case of deceased scientist, an obituary column is also included. The figure below represents the different components of the Imprints collection.



**Figure 4.** Components of Imprints Collection

The photo album is created using Jalbum.net software. The Imprints collection was initiated with the profiles of 18 scientists. Currently, the database has 32 profiles. It is accessible at [http://www.rii.res.in/htmls/library/imprints\\_collection](http://www.rii.res.in/htmls/library/imprints_collection) The main page looks as in figure - 5.



**Figure 5.** Imprints Collection Homepage

### 3.2 Navigation through imprints collection:

A click on any one of the names will take the user to the profile page of the respective scientist. Below is the profile page of Prof. N Kumar.

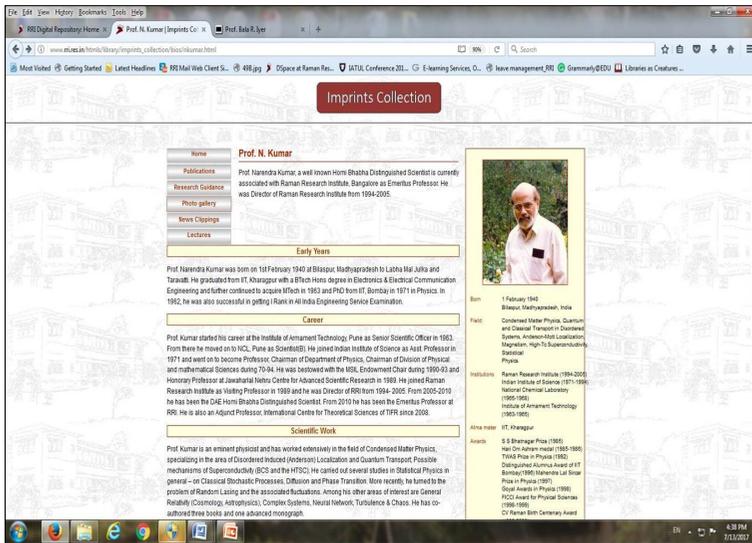


Figure 6. Profile page of a Scientist

Body of the profile page gives all the information about the scientist. Tabs on the left hand side top corner enables links to the scientists published papers, his research guidance, photo gallery etc. Right hand column provides quick information for a glance along with the ResearcherID badge. A click on publications tab will take the navigator to the list of publications in the repository. A collage of next levels of retrieval is given below in figure – 7.



Figure 7. Collage of Variety of Information in Imprints Collection

### 3.3 Advantages of Imprints collection:

- This is a new generation information retrieval tool assimilating the complete research output of a scientist as a one stop-shop, showcasing his/her life time research and accomplishments, spanning about 30-35 years.
- For one who is trying to collaborate with a scientist for a project or a scientific endeavor, Imprints collection could be a major source of information as it is complete in itself
- This is also a tool to showcase the areas of research of the Institute
- With the built in researcherID badge, this serves as a base for scientometric analysis for a library scientist.
- Above all, a bio-bibliographic database of this kind has incredible archival value.

## 4 Conclusion

Library services and their formats have been changing drastically ever since the Internet/WWW has crept into the library domain, facilitating librarians to design better, user friendly and also personalized services in addition to the conventional services. In the context of growing concern towards open access phenomena and publically funded research, libraries are expected to develop a platform to enhance the visibility of research carried out in an institute by showcasing them through institutional repositories. Raman Research Institute library has built an institutional repository with the intension of showcasing all the information associated with the founder, Sir C V Raman. Additionally, the repository also intends to bring visibility to the government funded current research carried out at the Institute. “Imprints collection”, is an offshoot of Raman Research Institute Digital Repository, having a unique style of looking at the scholarship of an institute and presenting research activities in a novel way for better use. This is one of the best practices of RRI Library.

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