# Institutional Repository Enhances Visibility and Prestige of the Institute- the case of National Institute of Technology, Rourkela

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## Introduction

There are many grounds that demand universal Open Access to scholarly information. Consistent hike in journal prices and diminishing library budgets are the common barriers that left the scientists around the world inaccessible to the scientific literature pool be in possession of journal publishers. Those access barriers represent impact barriers for research and researchers whose careers largely depending on visibility and eventually on citation counts [1]. There are other views that sound equally valid for the cause of OA. To fight with global epidemic like avian flu high-level local research capacity is required and it is impossible to achieve that without (open) access to scholarly literature, says Subbiah Arunachalam [2]. This opinion goes akin with the leading flu expert and WHO member Alan Hampson's, who says that there is an urgent need for international collaboration

among experts in the fields of Influenza and Respiratory medicine [3]. In an interview to Richard Poynder, Vitek Tracz, the founder of Biomed central, ascertains that biomedical research cannot function effectively without open, unrestricted access to research literature. He cites the freely available databases related to genome research and the developments happening around the genome science [4]. A study comparing OA versus non-OA articles in physics concludes that in terms of citation counts, there is a dramatic advantage in favor of articles that their authors have made it OA [5]. Impact of OA on all other disciplines is currently being analyzed. Above all, the overwhelming reason to consider OA is the potential to have an equitable world at least in terms of access to scientific information.

There are two routes to reach OA to science information- one is through OA journals and the other mode is author self-archiving in either centralized OA repositories or distributed institutional repositories. In comparison to other models, Institutional repository (IR) model is considered the best to attain quick universal OA, as they have better control in populating the archive. IR enhances the visibility of the research outputs locally produced. Researchers and their own institutions co-benefit from the enhanced visibility and research impact in terms of enhanced research funding and prestige. Institutional repositories also represent an historical and tangible embodiment of the intellectual life and output of an institution [6]. "This is the surest way of truthfully declaring that the results of publicly funded research (at least in the form of peer-reviewed scientific publications) are indeed accessible to the public- should it be interested", says N. V. Joshi [7].

**Institutional Repository- the case of National Institute of Technology**

In India, under the higher education reformation process, since the year 2002, the Ministry of Human Resources and Development, in phases, started upgrading the Regional Engineering Colleges to National Institutes of Technology. The upgraded institutes were bestowed with more working autonomy and amplified fund flow. To catch up international acclaim in terms of engineering education, research and development in line with IITs (Indian Institute of Technology) was the mission coupled with the status promotion. National Institute of Technology, Rourkela (NITR) < www.nitrkl.ac.in > was one of a few institutes got the status raise in the first phase itself. Soon after that, developments in various segments of the institute were set in motion. In response to the developments popped up in the institute and with a view to assisting the administration to attain international acclaim quickly, the Central Library of the institute started transforming itself into partner in various projects related to enhancing the visibility of the institute, exhibiting its strength in education and research in engineering and technology.

The NITR administration was so supportive to library staff to take part in various national level workshops organized by different agencies on different themes and that helped the library staff to update themselves with late developments in the field. The idea of setting up an institutional repository grew after the library staff gained conceptual knowledge on open access and technical skill on open access repository software through the participation of national workshops organized by M. S. Swaminathan Research Foundation, Chennai and Osmania University, Hyderabad respectively in the year 2004. Especially, training given by Prof. A. R. D. Prasad on Dspace-OA repository software, in the later workshop really made installation and maintenance of Dspace very easy.

At the beginning of 2005, the Central Library decided to setup OA repository server to archive locally produced research outputs and proposed it to the Director of the institute for permission and server facilities. The Director immediately consented and asked the systems team, who managed the institute's Internet and Servers, to partner with the library IR team. In mid march 2005, a dedicated high-end IBM server was allocated for Institutional Repository Project. Before, starting up the production system, trial installations were conducted in a low-end system and it went successful. By end of March 2005, the IR team with the help of systems unit installed Dspace-1.2.1 and other necessary softwares on RH-AS3 (Redhat-Advanced Server) platform for production. The repository was named Dspace@nitr. The domain name was registered < http://dspace.nitrkl.ac.in/dspace >. A set of simple submission guidelines was developed and linked with the homepage of IR. Links to SHERPA/RoMEO – publishers' copyright and self-archiving policy listings < http://www.sherpa.ac.uk/romeo.php > and another list prepared by National Council of Science Information (NCSI) were also added (Picture 1). The repository was registered with CNRI handle system < http://www.cnri.reston.va.us/ > in order to assign persistent identifier (handle no) for each digital object uploaded.

Picture 1

## Policy formulation

At the time formulating policies on content recruitment, the IR team was not able to decide on what kind of contents can be included. We consulted eprints@iisc- digital repository of Indian Institute of Science (IISc) < http://eprints.iisc.ernet.in >, Bangalore the only institutional repository be presented at that time and its emphasis was mainly on journal articles, conference papers and preprints. We decided to focus on archiving journal articles and include conference papers and pre-prints as well. The idea of creating omnibus repository consisting of thesis, dissertations etc was put off. Technically, the strength of IR softwares, is the protocol and the self-submission facility. The early Institutional Repository experiences around the world explored that the librarians/IR administrators may need to continue functioning as mediators between authors and IRs,

at least, till the authors fully embrace self-submission [9]. Accordingly, the IR team decided to render mediation in terms of submission and to assist copyright embargo problems.

**Populating the archive: strategies employed**

The success of institutional repository lies not on the exciting technology but on the desire of faculty for expanded visibility of and access to their research outputs [6]. The rate of desire in fact dictates the strategies. The IR team of NITR casually started its campaign about OA and the strength of the interoperable IR, and our approach got re-oriented as and when needed, in the course of populating the archive.

As soon as the server was ready, the IR team sent an email circular to all faculty and research scholars requesting to self-archive their research outputs. That email circular carried a list of benefits of self-archiving for individual authors and the institute as a whole. However, it created hardly any impact and no faculty turned up to respond to the mail. The IR team simply undeterred and investigated other outreach methods to reach out authors. We consulted a couple databases (Engineering Village-2, Scopus) to which the institute has access to and prepared a list of NITR authors who often publish papers in the past ten years. We gathered names of 50 authors and decided to contact them individually in-person as the number of authors is smaller in size. They were contacted by the IR team and informed the presence of IR and detailed the benefits of open access and self-archiving.

In the course of personal meetings with authors, it was found that almost none of the authors aware of the open access movement and its developments. Invariably, all expressed their concern about copyright. We tried to convince them showing the copyright transfer forms, carrying a note about self-archiving rights of authors, of publishers like Elsevier. All appreciated the idea of institutional repository by word and among them a few did it by giving their one or two recent research papers to upload. None of them were ready to deposit their complete list of papers. None of them accepted the concept of 'pre-print' archiving. Many institutional repository projects around the world initially faced these circumstances [8]. However, direct contact helped to manage 25 papers placed in the archive in 30 days. The IR team contacted and requested the recently retired/resigned faculties from NITR, to deposit their research outputs produced during their tenure with the institute. Around 60 papers were received from retired/resigned faculties. We registered the repository with Oaister-a project of University of Michigan that harvests and indexes the metadata from OAI-PMH powered repositories < http://oaister.umdl.umich.edu/o/oaister/ >. Search engine service providers like Google, Scholar Google, Yahoo etc. started indexing the objects in our repository.
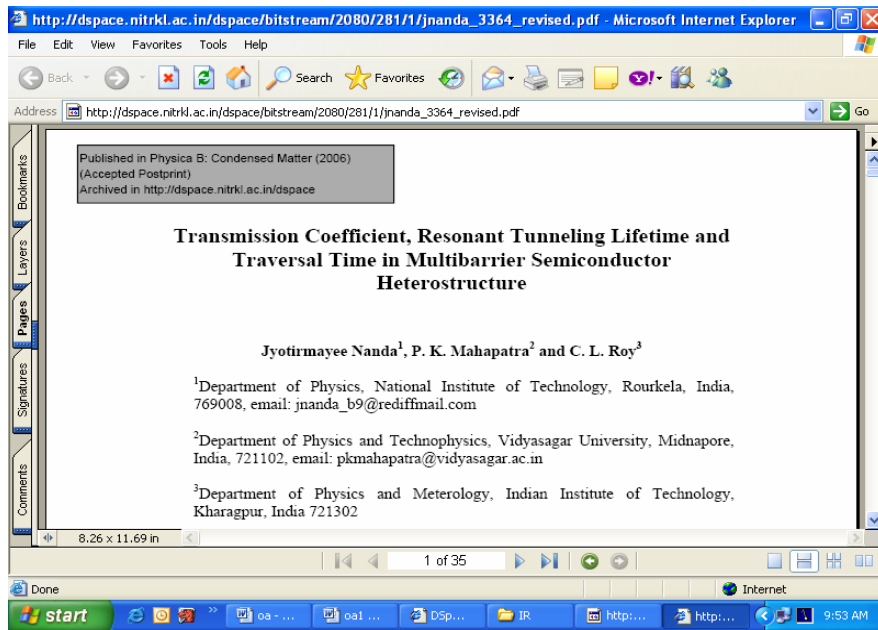
**Download Statistics**

Download statistics played a crucial role in populating the repository. The IR team collected downloads hits of individual documents, meager in number at that time, from the repository server log files which catalog all requests directed to the server. Most of the requests were from North America, UK, France, Turkey, China, South Korea, Malaysia etc. A list of hits of individual papers was emailed to the corresponding authors. The authors, who were initially very much reluctant to deposit, became very

much pleased over the download hits and came up to deposit their complete list of papers. They demanded periodical notification of download hits against their research papers. It really helped to form an archiving community. The IR team requested the authors who were thrilled over download hits to convince their colleagues to deposit their papers. A trusted colleague's word counted more than a librarian's. The institutional repository of NITR started witnessing a gradual growth in number of document uploads.
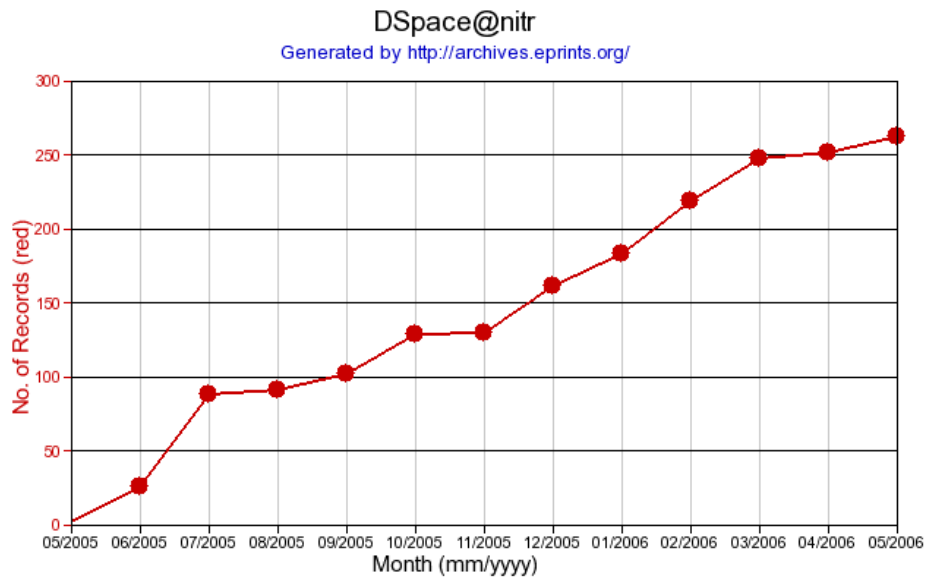


Prof. B. C. Ray of Material Science Department, while depositing his papers, suggested providing some authenticity details on the documents itself, apart from the associated metadata surrogates, in order to increase the credibility of the document for those who download and use. From that point we started doing so (picture 2). Whenever, the IR team meets faculty in-side the library or elsewhere outside it enquires about their recent publications and requests them to deposit the post-prints of the same. Presently, the repository holds about a little less than 275 research papers.

**Transmission Coefficient, Resonant Tunneling Lifetime and Traversal Time in Multibarrier Semiconductor Heterostructure**

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Picture 2

**Copyright Issues**

Presently, the repository administrator helps authors concerning copyright issues. Many journal publishers explicitly permit author self-archiving. Some of the publishers grant permission based on special request. Papers from NITR, by and large, come under the first category. On-behalf of authors, the repository administrator, usually seek consent from publishers who so far not openly endorsed author self-archiving. ASME and Scientific.net are the publishers granted self-archiving permission based on our request. When we studied publishers' policies on self-archiving rights, to help the faculty, we came to know that Institute of Electrical and Electronics Engineers (IEEE) insisted authors to self-archive the publisher's version with proper acknowledgement, whereas, many other publishers demanded self-archiving of post-prints(author's version). Informed faculties, who often publish in IEEE journals, transactions and conference proceedings, came up and archived (with the help of library staff mediation) their papers

as they found it so easy to collect their papers from *IEEE xplore* to which NITR has taken license to access.

**Immediate Benefits**

Until before the Minho University developed an add-on for dspace download statistics < http://wiki.dspace.org/StatisticsAddOn >, there were no tools available to document download hits against the individual documents in the repository. We are in the process of incorporating the add-on to our server. Presently, we are periodically collecting the download hits from server log files and manually organizing it. It is really time consuming and by some means we are managing it. While processing the download hits, it was observed that a large amount of requests from North America, next from UK followed by France, South Korea, China, Turkey, Taiwan, Singapore, Malaysia etc. A considerable amount of downloads from within India as well. More than 95% of the requests are directed from Google and Google Scholar. The other 5% from Yahoo and other search engines. Hardly any requests from the dedicated OA service providers like Oaister, despite well-structured than other common search engines.

**Monthly downloads**

| Month and Year | Downloads |
|---|---|
| November-2005 | 441 |
| January -2006 | 476 |
| March-2006 | 583 |
| May – 2006 | 633 |

One bit-stream view is counted as one hit.  Subjected to server break-down and other failures

Authors' feedback demonstrates these downloads certainly increases the visibility of the institute and leads to international research collaboration.  Prof. T K Sen, Professor of

Chemical Engineering, who had deposited all his papers with the repository, received an invitation to collaborate with University of Hawaii (Honolulu Campus) for a research project. In fact, in a personal mail, head of the project appreciated the repository where they found all the works of the professor of our Institute. Mr. Nagam Seshaiah, Research Scholar working on "Twin-Screw Compressor Applications" received mails seeking guidance from Research Scholars of City University, London. In fact, Mr Seshaiah has published a couple of papers in an Indian Journal (the journal has no web presence) but archived with our repository. There are many other cases that demonstrate visibility rise of the individual researchers (informal author feed-backs). These kinds of collaboration calls and interactions boost up confidence of individual researchers and raise the prestige of the institute- developing and trying to catch up international acclamation.

It is too early to gauge the complete impact of the repository, in terms of citation counts, funding etc. A study about the relation between downloads (usage) and impact (citation) predicts citations 6-24 months later from download today [5]. The early effects are very much positive and promising. Prof. Sunil Sarangi, the Director of NITR, appreciated the IR effort by saying "….it is not only a service to scientific community, but also shows the confidence of our NIT and its researchers to stand out among its peers" (private email).

**Future directions**

Considering the potential of the institutional repository to increase the visibility of institute, the NITR Senate has recently mandated self-archiving/mediated-archiving of research outputs produced locally. It came into effect on 15th May 2006. NITR is the first institute in India and sixth in the world enforced local level mandate <

http://www.eprints.org/openaccess/policysignup/ >.   The impact of mandate on author uploads is yet to be studied. There is going to be policy change in content recruitment, since the administration wanted to include doctoral thesis, conference proceedings and other research reports.  So far, as assumed, authors are not in favor of self-archiving and they prefer library mediated self-archiving only. We are planning outreach programs to change the attitudes of authors towards immediate self-submission of research papers, as soon as accepted for publishing in journals.   We are also planning for a series of lectures on Open Access and its impact on Science Communication.  Prof. Subbiah Arunachalam, a frontline Open Access advocate in India, has already given his consent for a lecture (sometimes in August or September of this year).

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