

**DIRECTOR'S FAREWELL ADDRESS TO NCL, NOVEMBER 29, 2010**

Dear colleagues, student friends, ladies and gentlemen:

I stand before you this afternoon to express a few thoughts and share some wisdom borne out of these eight long years I have had the honor to lead this great institution. I have worked with many of you closely over the past eight years in setting the agenda for NCL and executing it, step by step. Together we have accomplished some significant gains. I like to believe that we have built the foundations of a great future for NCL; and that I am leaving NCL a little better place than what I inherited years ago. These past few years have been the most satisfying to me personally. Everyday was a new day and every task was a challenge. These years have also been one of my best learning years. Each one of you taught me something that I will cherish for the rest of my life. Without exception, every one of you gave me your best. Working with all of you has been such a great joy. I will miss the awesome energy you all gave me when I wake up on the first of December.

At the very outset, I would like to warmly welcome Dr Sourav Pal as the ninth Director of NCL. We have in Sourav, an outstanding scientist, an inspiring teacher, someone who is approachable, has no pretense to either power or status and, above all, a warm and caring human being. I am confident that he will be a great leader, bringing his own simple, unpretentious style to bear on NCL. Through a blend of personal humility and professional will, I am certain Sourav will take NCL to great heights of enduring excellence. On my personal behalf and yours, I extend to him our best wishes and assure him that all of us stand behind him as he now takes command of this great ship and sets it sails into waters unknown.

I am particularly happy today for another reason. Sourav is the sixth Director of NCL to have come from within this organization. NCL is unique within CSIR in this respect. I know of no other laboratory of CSIR where six successive Directors have come from within. This points to the strong leadership pipeline this institution has created. It is good for the organization to have a leader chosen from within; he understands the ethos and culture of the organization, knows the

people well and, consequently, the comfort level within the institution is high. The credit for creating this pipeline goes to the past leadership of NCL, who inducted such great talent into NCL. Looking ahead, I already see several future Directors within NCL today, giving me great hope that this record is unlikely to be broken in the foreseeable future.

Friends, when I assumed office in July 2002, I laid out the major imperatives that NCL must seize if it has to maintain its position as one of the leading research institutions of the world. Let me briefly recapitulate them:

- To identify new growth engines for the future, which will give this laboratory the necessary strength to face a new world of science, a decade hence;
- To create a balance between innovation and discovery driven research. The former protects the present, whereas, the latter secures the future;
- To build virtual R&D networks and groups within NCL with a shared vision and goal. We must spread the word that only teams win, not individuals;
- To put in place a system of scouting and inducting new scientists into the organization to meet the demands of the future;
- To create a system (not person) centered organization;
- To redefine leadership roles and dismantle the last vestiges of a command and control style of leadership;
- To eliminate hierarchy, bureaucracy and futile paper work which tends to destroy a creative organization;
- To create robust internal and external communication systems using all forms of communication;
- To make NCL a continuing “learning” organization;
- To promote aggressively the use of IT in all aspects of NCL’s work processes;
- To encourage excellence in all aspects of students research ensuring that we provide the highest quality training and mentorship to our research students.

In the course of the past eight years, we have attempted to give shape to some of these visions and move closer towards their realization. We have attempted to foster in NCL an ambience which nurtures creativity and innovation, decentralized power, empowered young scientists and create a culture of collaboration. We have encouraged open communication and a consultative process to resolve all issues.

We have paid balanced attention to all aspects of a laboratory's growth. This includes, both, research as well as infrastructure development. When I took over, I realized that NCL had become too much of a contract research organization with a heavy dependence on research income from global companies. We were too satisfied in solving other people's problem. Whereas, there were some compulsions for adopting this strategy in the early nineties, I found that the same rationale was weak in the early two thousands. I, therefore, deflected the attention of NCL to an area where it has been traditionally, the strongest, namely, technology development and transfer. The results have been gratifying.

I have focused, both, on strategy as well as processes. It is my firm belief that without improving the process, execution of strategy is not possible. My eight years have given me unlimited freedom to experiment with new ideas which has received the enthusiastic support, both, from my colleagues within NCL and from CSIR Headquarters. I am beholden to them for this grace.

We still have several challenges to overcome. I am firmly of the view that, if we stay this course, NCL has the potential to become one amongst the most powerful and leading research institutions of the world.

In the Director's Report to the 44<sup>th</sup> meeting of the Research Council held on November 2, 2010, I have extensively described the initiatives taken over the last eight years and their outcomes ( Review of NCL's Performance, 2002-10, <http://newhome.ncl.res.in/files/admin/files/NCLCommittees/uploads/A225f443.%20Directors%20Report%20on%20NCL%20Performance>)

I will not, therefore repeat them here. Let me state with satisfaction that NCL has witnessed all-round growth in every sphere. Our science performance indicators show a 50 % increase in the number of PhD students and a corresponding increase in the number of publications. More importantly, the quality of our papers is on the rise, with average impact factor that was about two now inching towards three. Our technology performance indicators have also been gratifying. We saw six of our technologies entering commercial markets, three reaching the level of large scale demonstration and validation and three reaching pilot plant stage. In a unique manner NCL has created great value to a global company through contract research. Two products have been introduced by P&G in the US market where NCL's contribution has added significant value. I was privileged to represent CSIR at Cincinnati on 27 October 2010, where, CSIR's role in Open Innovation to P&G was publicly recognized by the CEO of P&G in the presence of over 200 key global technology and business leaders. Our NCL team has worked relentlessly with the P&G team to make this happen over the past five years. We are indeed proud of them.

This is no mean record. At NCL we do not proclaim technology success till the products reach the markets. I have lived the credo that it is far better for our customers to praise us than for us to praise ourselves.

Developing and deploying technology is a painful process. It is time consuming, requires patience and perseverance and needs leadership commitment for teams to deliver. Working in teams is always more difficult than working alone. While individual excellence in science is noticed, and sometimes, rewarded quickly, rewards in case of technology development take time. This is one reason why scientists are lured by the call of individual pursuit of science.

Yet we must recognize the inevitable writing on the wall. Whereas, excellence in science is a prerequisite, NCL cannot justify its existence based on the performance of its science alone. Publications and patents are not an end in itself, but a means to an end. In the long term NCL will be recognized and remembered for the wealth it creates in the society through its science.

Notwithstanding above, NCL's success in technology development is receiving peer recognition. We won the coveted ICC Award in Technology Development this year, after a long gap of over twenty years. Our efforts in creating value out of biomass have earned NCL the coveted Vasvik Award, announced just yesterday. Incidentally, our partner Godavari Biorefineries Ltd, has just announced a 500 crore IPO to fund the construction of a plant for cellulose from bagasse based on NCL's contributions. To the best of my knowledge this will rank as the largest fund raising effort by a company to deploy a technology originating from a publicly funded laboratory and is a true measure of the confidence that NCL enjoys with its partners.

We have taken several initiatives in building new research initiatives cutting across disciplines. Many of them will lead to significant outcomes in the future years. These include, our continuing efforts in the area of PEM fuel cells, three Centers of Excellence, namely, Microreactor Engineering, Advanced Materials for Solar Energy Conversion, Scientific Computing and the Joint Research Initiatives in Chemistry – Biology Interface with IGIB, New Delhi. In fact, tomorrow, we will announce new plans to take the NCL-IGIB JRI to even greater heights in the years to come.

The most exciting part of these initiatives is that all of them are interdisciplinary and cross functional, involving teams drawn from different Divisions of NCL.

In my opinion, herein, lies NCL's greatest opportunity. NCL cannot compete only based on the individual excellence of its scientists. Many good institutions in India (IIT, IISER, and IISc) all have equally good or better scientists. But what NCL can do, which in my opinion no one else can do, is to bring the collective force of its individual excellence to focus on large problems, creating great science and even greater good for the people. The new initiatives which NCL has put in place are to achieve this objective. I have often stated, and I repeat again, that in the long run only teams will win, not individuals.

Accomplishments of this kind require investments. Our annual budget which was Rs 32 crore in 2002-03 now stands at Rs 114 crore. This is a stupendous 200% increase! I wish to place on record

our gratitude to DG CSIR for this great munificence and his implicit faith in the abilities of NCL.

Over the last few years I have not spoken much of that famous CSIR term “ECF” which many of our older scientists will recall. It is not that I have forgotten but have refrained from overemphasizing its importance. Our ECF has more or less remained steady at about 20 crores per annum since 2004-05. This must increase, but not through mere services or contract or government funded research. Our earning must rise through technology and patent licensing fee, royalties, high value consultancies, knowledge partnerships and selling our equities in high technology enterprises. Unless we bring such additional revenue streams, our ECF will continue to stagnate at 20 crores.

In the end, we must create new metrics for value creation for publicly funded laboratories. I have recommended to DG-CSIR that the term ECF must be struck off the lexicon of CSIR and be replaced by a new term which better describes the value a laboratory has created. In the end we only value what we measure. So it is very important to have the right metrics. In any case it is time to abandon ECF as the metric; it has outlived its utility.

Over the last eight years we have welcomed forty three new scientists. They are our tomorrow's leaders. We have institutionalized a robust process to identify talent and bring them on board. We have replaced the outdated process of advertising jobs with a more proactive process of scouting for talent. I tell every new scientist who joins NCL that it is their responsibility to identify new talent for NCL. Our young people are our best ambassadors. We have created a culture of inclusiveness in such decision making through a participative collegiate approach. NCL has maintained the highest standards of quality while inducting new talent. If at all, we have erred it is on the safe side while making choices. The legendary Max Perutz, Nobel Laureate and the founding Director of MRC, Cambridge was asked when he stepped down as Director on how he created such an institution which produced over half a dozen Nobel Prizes and scores of FRS. His answer was simple. He said that he only hired people who are better than himself, and once hired, he got out of their way. The prescription for building a great institution is

clear. Get the right people into the organization, make certain they are better than the existing people and let the laws of evolutionary biology take over !

When I took over NCL had 306 Group IV level scientists. Today we have a little over 200. This reduction in number is in spite of adding forty three people. NCL's productivity has not diminished. On the contrary it has improved. I believe that a smaller organization is more nimble and efficient. Ideally I think NCL will need about 150 scientists. But we must ensure that every one is a leader. They must be complemented by students and project staff. The older style of one dominating leader and several lesser mortals as followers is no longer relevant for twenty first century science. Leadership must be spread across NCL at all levels. Leadership must not be confused with the rank of a scientist in the hierarchy or his pay band.

As NCL moves into the future, students will become a more important component of the research enterprise. The formation of AcSIR will propel us into new orbits of excellence in teaching and research. I must state that this will be disruptive, especially for our ageing scientists, who have gotten used to an older way of doing things. However, the old must inevitably give way to the new. Higher standards for student eligibility for entering a Ph D programme, rigorous course work with a comprehensive examination, failing which the student must exit the Ph D programme and higher standards for individual scientists to be recognized as guides are on the cards.

In retrospect, our decision to better organize our PhD programme looks prescient. We now have a well defined process for inducting students, a student academic office, a student academic committee and a course work, predominantly taught by our scientists. When I sowed these thoughts seven years ago there was much resistance from several of my colleagues. The argument was why tamper with a system that has been working for several years. Yet I felt that a change was necessary, if the quality of NCL students have to go up; and we made the change, thanks to a few champions who supported me. Because of this, I think NCL is better placed to take the next leap, of meeting the higher standards that will be imposed on us by AcSIR.

NCL currently has about 430 students on its rolls. We should target to increase it to 600 in another year's time.

One of the severe limitations we have been facing is the shortage of accommodating students on campus. Over the years we have found some temporary accommodation for our students in our campus. I have long felt that NCL requires one more Hall of Residence and have been trying to get CSIR's approval for construction. I am delighted to inform you that this proposal has been approved by DG-CSIR this morning. DG CSIR will lay the Foundation Stone for the new Hall of Residence tomorrow at NCL. I could not have received a better parting gift from DG-CSIR. I wish to publicly acknowledge our gratitude to him for this gesture.

Friends, we have made great strides in many other areas. Many of you who joined NCL in recent years may not know that NCL did not have the following dispensations in 2002:

- An intranet portal ncl@home
- A project management and MIS system
- A budgeting system to all activities within NCL in terms of office productivity budget and equipment maintenance budget depending upon whether a given equipment is a divisional facility or "open-to-all" facility
- A Director's calendar and a Director's podium open for everyone to see bringing greater transparency in communications and lifting the veil of secrecy from the affairs of the Director
- Divisional affairs committees
- Web mail and wireless connectivity
- A smart card based personal identity and attendance system for enhanced security
- A digital communication system with full convergence
- Video conferencing facilities
- Meeting rooms and conference rooms in every wing including the Guest House
- Enhanced digital library resources and access to Scifinder to all scientists
- On line purchase indenting system
- Web based job advertisement system

- New buildings on campus, Digital Information Resource Center (DIRC), a new Cafeteria, a Molecular Biology Laboratory, a state of the art Board Room adjacent to the Director's office, Library Reading Lounge and the Polymers and Advanced Materials Laboratory
- A Publication and Science Communication Unit
- A Research Planning and Audit Unit as well as a Human Resources Development Unit
- NCL Innovation Park and Venture Centre, the first company that NCL floated to create an eco system for converting early stage discoveries to wealth
- A better structured IP unit meeting the needs of tomorrow

I have derived inspiration from many of you in NCL in trying to put in place systems and processes that enhance our productivity, provide better ambience for creative endeavors and make living and working a pleasant experience for all of us.

We took the bold step to bring NCL closer to a world class Research University, namely IISER Pune. It is too early to say whether this was a wise or unwise step. I do not underestimate the formidable difficulties in forging seamless collaborations between institutions. Only time will pass a verdict on this decision. Yet, in my heart I believe that education and research must establish a symbiotic relationship for both to survive. Both NCL and IISER have much to gain by being proximate to each other. I have often publicly stated that NCL, IISER and NCL Innovation Park housing the Venture Center and other public private partnership entities in NCL Innovation Park constitute a powerful innovation cluster the like of it which does not exist anywhere in the world. With over 500 faculties and 1000 PhD students, sparks must fly, igniting minds and creating entirely new and unforeseen opportunities. Yet all this is possible only when there is healthy respect amongst professionals of both these institutions, a spirit of partnership and sharing of resources and a unity of purpose amongst the leadership. History of Indian Science is littered with examples of great institutions in proximity, but staying in isolation because of inflated egos of individuals. We have to work

hard to avoid falling into this trap. We must make our ego subservient to the larger good.

I am happy that the next Director of NCL shares the same passion that I have had in creating this vision. He is one of the few amongst us who teaches undergraduate classes in IISER. This spirit will only make the relationship stronger in years to come and provide more opportunities to teach and perform joint research with IISER. I know how busy a Director can become. I only hope that Sourav continues to teach at IISER even as a Director. This will send a strong message across both NCL and IISER and elevate the relationship to even greater heights.

Friends, a Director's job is never done. Although I depart with a sense of fulfillment, for having done my best, I am conscious of the larger challenges looming in the future. This is the unfinished agenda. My successor, while standing on the foundations that exist today must think beyond and build the edifice for the future of NCL.

I had shared my vision of the future of NCL in my Director's Report to the 44<sup>th</sup> RC meeting

<http://newhome.ncl.res.in/files/admin/files/NCLCommittees/uploads/A225f443.%20Directors%20Report%20on%20NCL%20Performance>

I will not repeat them here. I encourage all of you to read it, debate it in small groups, fine tune them and create a future vision for NCL, that is, both, relevant and appropriate.

Permit me to place before you today some thoughts on the subject.

- NCL must lead some mega projects in the Twelfth Five year Plan. NCL assumed leadership in two projects in the Eleventh Five year Plan Projects. This has given great visibility to NCL scientists and science. NCL cannot become only part of the projects that others lead. We must be the leaders of thought and action. There are some good plans that are under discussion. We must take them forward with great vigor.
- NCL must sow the seeds of some programmes that will create entirely new institutions in the next decade. In my opinion NCL

must give birth to at least two new institutions, that will serve the agenda of the future. This country will need new institutions of research to fulfill the needs of the country thirty to forty years hence. We need to think of what this need could be. It is not always practical to change existing older organizations and make them focus on radically new areas. If new and radical thinking is needed, then it is easier to create such institutes anew with the right skills and infrastructure.

- NCL must contemplate the next logical direction for its growth, to become a fully autonomous publicly funded research organization. Our honorable Minister, Shri Kapil Sibal has been repeatedly asking why NCL must be tied to the apron strings of the Government. NCL can pursue a model where it will continue to stay as a prized national resource fully in the public space with an autonomous structure of governance.
- NCL must become even more credible to Indian industry. Today our involvement with Indian industry is patchy. We need to be more creative in putting together contractual agreements and experiment with new ideas for wealth creation through public private partnerships. New start ups based on NCL's science, equity ownership in companies in lieu of fees and royalties, creating new entities with focused group of industries around key knowledge competencies, putting together industry consortiums for pursuing generic technologies are some of the initiatives NCL must aggressively pursue. We have the basic systems in place already. They need to be further strengthened to suit the emerging demands of the future. In fact Venture Center will soon spin off two entities in the near future, namely, CSIR Tech and a new NMITLI Innovation Centre. Let me quote the words of our Prime Minister which gives us the direction for the future, *"Let private enterprise partner public science and technology institutions in their translation and transformational efforts. Let them join hands with our public institutions, in creating new manufacturing strategies for both strategic and non strategic applications. Let there be publicly-owned and privately-operated world class R&D facilities "*
- NCL must continue to invest more in further strengthening our innovation eco systems (NCL Innovations, Venture Center, IP

management systems) as well as identifying new talent who have the ability to act as an interface between science and business.

- We must continue to scout new talent at, both, entry level and leadership level for NCL. Senior leadership must assume greater ownership of this process. Talent of the highest order is not easily available today. We have to be passionate and persuasive about telling why NCL is a great place to work. We must then match our words with action and make our new entrants welcome at NCL.
- NCL must become more adept in developing products. Our track record here has been poor. Product development requires multiple skill sets, not all available internally. This requires much greater partnerships. Sectors like health care, water and energy will test NCL's product development skills. This is hard work and, therefore, there is a tendency to stay away from such efforts. NCL has to create appropriate enabling mechanisms for scientists to engage in product development efforts without feeling as if we have thrown them to the wolves.
- While core scientific activities must be strengthened, the structure of divisions must slowly fade away. The very word "Divisions" conveys a wrong message. We do not need any structure that will divide us; we need new structures that will unite us into productive cross disciplinary teams. I strongly believe that all activities must be managed by collegiums of faculties, with a rotating Chair. They will be responsible for efficient utilization of resources, safety and maintenance of common facilities. Both young and old must be part of these collegiums. All decisions must be consensual. NCL must become even more flat in the next few years, with minimum hierarchy. Director must become accessible to more and more people as direct reports. This is taxing to the Director but healthier for the organization.
- The Director of NCL is only one amongst equals. He must be approachable and friendly, not pompous or give the feeling that he knows it all. He must be a great listener. He must allow for ideas to bubble up from below. Divisional Affairs committee must be replaced by Laboratory affairs Committees where

small groups of interested people take ownership of decision in their respective areas.

- The NCL administration must treat all scientists as equal. Unfortunately the system of hierarchy is too deeply entrenched in our system. Words and ideas are respected when they come from someone who occupies a chair. We need to move more to a system when ideas are respected based on their intrinsic merits, not who says them.
- NCL has to open its doors more widely to global participation in its research. So far this has meant that NCL scientist will go abroad and do collaborative research in an overseas laboratory. We still live in an age when India was thought of as a developing country short of resources and if we had to do worthwhile research we had to go abroad. In the next decade India will go on to become the third most powerful economy in the world from being a third world country. While I am not rejecting the idea of traveling abroad, we must make NCL a more attractive destination for post doctoral fellows and visiting professors from overseas. We must play host to faculties from abroad who perform and build research groups at NCL. The Nehru PDF scheme allows for foreign post docs. We have STIO schemes to invite distinguished foreign scientists to come and perform research in our laboratories. We have already taken a decision, in principle, to have foreign members as invitees in our Research Council. Several more new initiatives are needed here. Many of our colleagues prefer to spend long months in overseas laboratories. While this is certainly necessary in the early part of one's professional career, I wonder what value this adds to mid level and senior scientists. The more important question is how many professors from overseas consider it worthwhile to spend two or three months in NCL. NCL in particular and India, in general, cannot continue to look to the west for gaining wisdom or knowledge.
- NCL must continue its tradition as a learning organization. We have encouraged in the past several discussion and seminar groups within NCL, named lectures and extending invitation to anyone who can share a thought with us, irrespective, of his discipline. I have liberally supported their travel from NCL's budgets. We need to expand these initiatives even more. More

of our scientists must take on the leadership of organizing lectures, workshops and seminars. NCL must never stop learning; when it does it will die. To quote Eric Hoffer, *“In times of change learners inherit the earth, while the learned find that they are beautifully equipped to deal with a world that no longer exists”*. I hope that NCL does not have too many “learned ” persons!

In the end, NCL must become an institution with enduring values of excellence devoted to acquisition (research), transmission (teaching) and application (wealth creation) of knowledge. NCL has to assume the character and competence of some of the leading research universities of the world, where, scientific research and teaching of the highest quality co-exist with the objectives of creation of wealth in society. This has to be our dream.

My friends, I have taken a lot of your time this afternoon. I respect the patient hearing you have given me. Let me conclude by saying what a great pleasure this journey has been to me, to be your spokesman and champion, to lead this laboratory attempting to make the transition from good to great. It has enriched my life beyond words. Every one of you has given me your best, under less than optimum circumstances. I have not given you all the resources that you needed to perform, or all the recognition that you deserved for the performance. Sometime I have been harsh, but have tried hard to keep my head cool and not utter words that can cause hurt. Yet inadvertently I may have hurt some of you. I seek your apologies. I have treated everyone of you as my friend and all of us as fellow travelers in this journey.

It is my belief that life is a journey, not a guided tour. In this journey there are no winners or losers, only survivors. As Charles Darwin taught us centuries ago, it is not the strongest of the species that survive, or the most intelligent, but the ones most responsive to change. I hope NCL will continually keep changing for the better.

Time has come for me to leave this ship. Yet this ship will continue to sail into new territories, bringing in its wake new treasures and opening up new continents. This journey will be exciting. Some of us will watch from the shores the success of this voyage and wish it well.

I have enjoyed my stay and have done my best to leave NCL a stronger organization. As I said on July 1, 2002, when I addressed the staff and scientists of NCL, the leadership of this great institution is a trusteeship, which I have been fortunate to receive. I have held it with great care and embellished it with whatever I could. I am now ready to pass this legacy on to Dr Sourav Pal who will have the good fortune of leading this laboratory for the next six years.

I wish to gratefully acknowledge the contributions of every one of you, scientific as well as supporting, who make this laboratory a pleasant and productive place for all of us to work. I also wish to place on record the wonderful support I have been receiving from the Research and the Management Council of this Laboratory in the discharge of my responsibilities. I thank the staff at CSIR Headquarters for their unstinted support to NCL. Finally my deepest gratitude to Dr R.A. Mashelkar and Professor Samir Brahmachari who have nurtured me, reposed complete faith in my abilities and provided abundant support when ever I needed them. Without this magnanimity, I doubt whether I could have achieved what I did.

Jai Hind and May God bless all of you!