**ANNEXURE - A**

**Format of NEW Project Proposals to be submitted to the**

**Indian Statistical Institute**

1. **Project Title :** KBS Fest.
2. **Name of Proposing Scientists:** Jaydeb Sarkar, ISI Bangalore.

### Name of Others Scientists associated with their affiliation: B. V. Rajarama Bhat from ISI Bangalore, Debashish Goswami and Partha Sarathi Chakraborty from ISI Kolkata, Arup Pal from ISI Delhi and Krishna Maddaly from Ashoka University.

1. **Date of Commencement:** 12-14 December, 2019 (Tentative).
2. **Project Summary (Max. 200 words):**

The objectives of this conference are to honor the distinguished career Professor Kalyan Bidhan Sinha (KBS) and to bring together leading experts and young researchers in the field of linear analysis to discuss recent developments and applications of functional analysis and operator algebras. We anticipate an exciting gathering of former and current students, collaborators, colleagues, and friends of KBS. In the process, it will celebrate the 75th birthday of Professor Kalyan Bidhan Sinha and his mathematical influence.

The initial field of research of Professor K B Sinha was the subject of scattering theory and Schrodinger operators. His lecture notes (jointly with W. O. Amrein and J. M. Jauch) is indispensible for researchers in this area. He continues to be active in this topic.

Along with K R Parthasarathy, K B Sinha lead a school of quantum probability in ISI New Delhi. They wrote a series of papers and also guided several students. In addition invited top researchers in the field to ISI for short and long term visits. This firmly established India as one of the major centers for quantum probability. Currently he is the president of the Association for Quantum Probability and Infinite Dimensional Analysis (AQPIDA).

NCG: KBS was the pioneer of the new area called noncommutative geometry (NCG) a la Connes in India. Under his influence and encouragement, PS Chakrabarty wrote his thesis in NCG (2000) the very first one in this field by an Indian Ph D student. At the same time, few other young mathematicians present in ISI Delhi and/or having research collaboration with KBS, were enthused by this work and began working in problems in NCG as well as on the interface of NCG and quantum groups/quantum probability etc. Within less than two decades , there are a significant number of people in various institutes of India (ISI, IMSc, NISER, IISER’s, IISc) with second or third generations of Ph D students, working in NCG.

1. **Introduction with Background (Max. 300 words):** NA
2. **Description of the problem (Max. 300 words):** NA
3. **Objectives:** NA
4. **Study area:** NA
5. **Review and status of research and development in the subject (Max. 500 words.)**
   1. **International Status:** NA
   2. **National Status:** NA
   3. **Novelty of the present proposal:** NA
6. **Importance of the proposed project in the context of current status (Max. 200 words):** NA
7. **Review of the expertise available with the group/institute in the subject of the project**
8. **Work Plan:** NA
   1. **Methodology:** NA
   2. **Organization of work element and time schedule of activities giving milestones:** NA
9. **Utilization of Research Results:** NA
10. **Budget Estimates : Summary (For one year)**

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| **REVENUE** | (Rs. in lakhs.) |
| 1. Guest house and hotel accommodation for participants (50 heads x Rs 1500/night x 4 nights) 2. Dinner and breakfast (55 heads x Rs300/head x 4 times) + Working lunches, tea and snacks (75 heads x Rs250/head x 3 times) 3. Domestic travel support for senior mathematicians (5 heads x 14000) 4. Local transport 5. Workshop material (stationary, conference material, printing etc.) 6. Miscellaneous | 3  .66 + .57 = 1.23  .7  .5  .5  .2 |
| **CAPITAL** | 0 |
| Grand Total | 6.13 (Rs. in lakhs) |

1. **References :** NA
2. **Does the project require clearance from the Review Committee for the Protection of Research Risk to Humans? If yes, apply for the clearance through the prescribed form. If no, submit the waiver form forwarded by the P-in-C.** NA
3. **Quarterly projection of Expenditure during Year 1 :** NA
4. **List of all completed and/or ongoing project undertaken by the proposing scientists in the last 5 years:**
5. Project Title: ATMW Modern aspects of Function Theory, Operator Theory & Operator Algebras. Duration: March 13-10, 2018. Funding agency: DAE. Money budgeted: 5 lakhs. Money spent: 5 lakhs.
6. Project Title: Quantum Probability: Past, Present and Future. Duration: August 10-12, 2017. Funding agency: JC Bose Fellowship of Professor Rajaram Bhat. Money budgeted: 3 lakhs. Money spent: around 3 lakhs.
7. Project Title: North-East Summer Workshop in Analysis and Probability (NE-SWAP 2017). Duration: July 06-July 10, 2017. Funding agency: ISI. Money budgeted: 5 lakhs. Money spent: around 5 lakhs.
8. Project Title: Madhava Competition Nurture Camp. June 05-09, 2017. Funding agency: DAE. Money budgeted: 4.5 lakhs. Money spent: around 4.5 lakhs.
9. Project Title: Recent Advances in Operator Theory and Operator Algebras :OTOA-2016. Duration: December 13-22, 2016. Funding agency: ISI, NBHM and IMSc. Money budgeted: 12 lakh. Money spent: around 12 lakhs.
10. Project Title: TSSRK Fest. Duration: September 22-24, 2016. Funding agency: ISI. Money budgeted: 6 lakhs. Money spent: around 5 lakhs.
11. E. Project Title: North-East Summer Workshop in Analysis and Probability (NE-SWAP 2016). Duration: May 31-June 4, 2016. Funding agency: ISI. Money budgeted: 8 lakhs. Money spent: around 6.7 lakhs.
12. Project Title: Advances in Noncommutative Mathematics. Duration: 2016-2017. Funding agency: ISI. Money budgeted: 9 lakh. Money spent: around 8 lakhs
13. B. Project Title: Complex Geometry and Operator Theory. Duration: December 01-03, 2015. Funding agency: ISI and IMSc. Money budgeted: 5 lakh. Money spent: around 5 lakhs.
14. Project Title: North-East Summer Workshop in Analysis and Probability (NE-SWAP 2015). Duration: June 27-30, 2015. Funding agency: ISI. Money budgeted: 7.17 lakhs. Money spent: around 6 lakhs.
15. Project Title: Contractive Hilbert modules. Duration: 3 years. Funding agency: NBHM (DAE). Money budgeted: 3. 32 lakhs. Money spent: around 2 lakhs.

List of Publications of the proposing scientist in last three years:

1. On Quotient modules of H^2(D^n): Essential Normality and Boundary Representations (with B. K. Das and S. Gorai). To appear in Proceedings A of the Royal Society of Edinburgh.
2. Contractively embedded invariant subspaces (with S. Gorai), To appear in Operator Theory Advances and Applications.
3. Toeplitz and Asymptotic Toeplitz operators of H^2(D^n): (with A. Maji and S. Sarkar). Bulletin des Sciences Math\'{e}matiques, 146 (2018), 33--49.
4. Covariant representations of subproduct systems: Invariant subspaces and curvature (with H. Trivedi and H. Veerabathiran). New York Journal of Mathematics, 24 (2018), 211--232.
5. Rank of a co-doubly commuting submodule is 2 (with A. Chattopadhyay and B. K. Das). Proceedings of American Math Society, 146 (2018), 1181-–1187.
6. Contractions with Polynomial Characteristic Functions II. Analytic Approach (with C. Foias and C. Pearcy), Journal of Operator Theory, 78, (2017) 281--291.
7. Factorizations of Contractions (with B. K. Das and S. Sarkar). Advances in Mathematics, 322 (2017), 186--200.
8. Dilations, Wandering Subspaces, and Inner Functions (with M. Bhattacharjee, J. Eschmeier and D. Keshari), Linear Algebra and its Applications, 523 (2017), 263–-280.
9. Factorizations of Kernels and Reproducing Kernel Hilbert Spaces (with R. Kumari, S. Sarkar and D. Timotin). Integral Equations Operator Theory, 87 (2017), 225–-244.
10. Factorizations of Characteristic Functions (with K. J. Haria and A. Maji). Journal of Operator Theory, 77, (2017), 377--390.
11. Ando dilations, von Neumann inequality, and distinguished varieties (with B. K. Das). Journal of Functional Analysis, 272 (2017), no. 5, 2114–-2131.
12. Analytic Model of Doubly Commuting Contractions (with T. Bhattacharyya and E. K. Narayanan). Operators and Matrices, Volume 11, Number 1 (2017), 101-–113.
13. Characterizations of Symmetrized Polydisc (with S. Gorai). Indian Journal of Pure and Applied Mathematics, 47 (2016), 391--397.
14. Inner multipliers and Rudin type invariant subspaces (with A. Chattopadhyay and B. K. Das), Acta Sci. Math. (Szeged) 82 (2016), 519--528.
15. Operator positivity and analytic models of commuting tuples of operators (with M. Bhattacharjee). Studia Mathematica, 232 (2016), 155--171.
16. An Invariant Subspace Theorem and Invariant Subspaces of Analytic Reproducing Kernel Hilbert Spaces - II. Complex Analysis and Operator Theory 10 (2016), 769–-782.