



PRESIDENCY UNIVERSITY  
KOLKATA

PRESIDENCY UNIVERSITY, KOLKATA  
Finance Department

Memo No: PU/FRPDF/2017-18/7

Date:22-12-2017

To  
Dr. / Prof. Mausumi Sikder  
Associate Professor  
Department: Life Sciences  
Presidency University, Kolkata

With pleasure, the undersigned is to inform you that the competent authority of the University has been pleased to sanction a fund of Rs. 1, 78,000/- (Rupees One Lakh Seventy Eight Thousand only) as detailed below to carry out your research project titled "Study on the antimicrobial effect of herbal supplements on multiple antibiotic resistant Community-Associated *Staphylococcus aureus* strains"

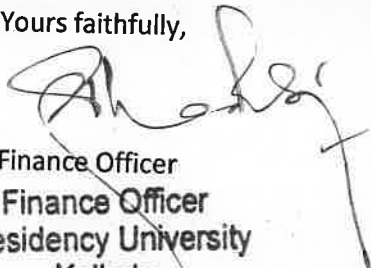
Head of Expenses	Sanctioned Fund (Rs.)
Consumables	18,000.00
Lab & IT Equipment	70,000.00
Computer Hardware & Software	90,000.00
<b>Total</b>	<b>1,78,000.00</b>

The fund is sanctioned under the following terms and conditions:

- Compliance with the extant financial rules and Presidency University Guidelines for Purchase and FRPDF is to be ensured while utilizing the sanctioned fund.
- The fund is to be utilized within the financial year 2017-18
- If any publication is made utilizing this fund, it should be duly acknowledged by you.
- Involvement of UG/PG students in your research activities is to be ensured
- Inter-head transfer of sanctioned fund should be restricted to the amount of Rs.5,000/- in total.

Thanking you.

Yours faithfully,

  
Finance Officer  
Finance Officer  
Presidency University  
Kolkata

  
Registrar  
Presidency University  
Kolkata

  
Director  
Internal Quality Assurance Cell (IQAC)  
Presidency University  
Kolkata-700073

**Revised Budget**

Project Title "Study on the antimicrobial effect of herbal supplements on multiple antibiotic resistant Community-Associated *Staphylococcus aureus* strains"

<b>Head of Expenses</b>	<b>Sanctioned Fund (Rs.)</b>
Consumables	18,000.00
Lab & IT Equipment	70,000.00
Computer Hardware & Software	90,000.00
<b>Total</b>	<b>1,78,000.00</b>



Signature

Dr. Mausumi Sikder

Associate Professor

Department: Life Sciences

**DR. MAUSUMI SIKDAR**  
Associate Professor,  
Dept. of Life Sciences,  
Presidency University,  
86/1 College Str,  
Kolkata-700 072

**PROJECT PROPOSAL FOR FRPDF SCHEME 2016-'17**

**Submitted by:**

**DR. MAUSUMI SIKDAR ( nee BHAKTA),  
Associate Professor,  
Department of Life Sciences,  
Presidency University,  
86/1, College Street,  
Kolkata – 700073.**

**Email : [mausumi.dbs@presiuniv.ac.in](mailto:mausumi.dbs@presiuniv.ac.in)**

## Proposed Research Work

**(i) Project Title: Study on the antimicrobial effect of herbal supplements on multiple antibiotic resistant Community-Associated *Staphylococcus aureus* strains.**

**(ii) Introduction :** *Staphylococcus aureus* is a part of normal skin flora. But it is also an opportunistic pathogen, responsible for more than ten percent of all nosocomial infections. Some species of *Staphylococcus* cause infections ranging from minor skin infections to life threatening diseases like endocarditis, pneumonia etc<sup>1</sup>. *S.aureus* infections may be either nosocomial, i.e., acquired in hospitals and was not present at the time of admission, or community acquired, i.e., they arise in the community as opposed to nosocomial infections. With increasing use and misuse of antibiotics, in clinical practice, more and more bacteria are becoming resistant to multiple antibiotics. Methicillin resistant *S.aureus* (MRSA) was first reported in 1961, just one year after the introduction of methicillin into clinical practice<sup>2-8,10</sup>. The current therapeutic options for the treatment of infections due to MRSA is limited to a few expensive antibiotics such as vancomycin, linezolid, daptomycin, streptogramin etc. Vancomycin resistant *S.aureus* strains has also been reported recently<sup>9</sup>. In order to find out an alternative to costly antibiotics, which may be used for treating infections due to MDR strains, antibacterial properties of herbal compounds are being tapped, as phytochemicals have fewer side effects than chemically synthesized compounds<sup>11,12</sup>. This study is being done to study the antimicrobial activity of *Catharanthus roseus* root and garlic extract, so that they may be used as an alternative to commonly used antibiotics.

**(iii) Objectives :** a) Determination of prevalence of antibiotic resistance pattern in community associated *S.aureus* as well as in some nosocomial *S.aureus* strains in and around Kolkata. b) To make a comparative analysis between nosocomial and community associated *S.aureus* strains in terms of their antibiotic sensitivity and resistance patterns. c) To identify the antibiotic resistance pattern of multiple antibiotic resistant (MDR) strains are plasmid related or not. d) To investigate whether any of these resistant plasmids could be eliminated by extract of *Catharanthus roseus* root / garlic extract, so that it could be used as an alternative to antibiotics for the treatment of infections caused by MDR *S.aureus* strains.

Msida 08/07/2011

**(iv) Methodology :**

- a) Determination of antibiotic susceptibility pattern by Disc agar diffusion method. And Agar well diffusion technique<sup>13</sup>.
- b) Determination of Minimum Inhibitory Concentration(MIC) and Minimum Bactericidal Concentration (MBC) of extract of *Catharanthus roseus* root / garlic<sup>13</sup>.
- c) Study of bacterial growth kinetics in presence and absence of *Catharanthus roseus* root / garlic extract.
- c) Plasmid isolation and purification from MDR *S.aureus* strains.

**(v) Phase-wise Plan of work and targets to be achieved:**

Collection and Confirmation of bacterial strains: Strains of *S. aureus* will be collected from common people randomly and also from patients of different hospitals of Kolkata. followed by confirmation of the collected strains by the following tests: Catalase test, gram staining, growth on 10% NaCl plate, growth on blood agar plates.

Antibiotic resistance pattern profiling of both types of collected bacterial strains: Antibiotic susceptibility pattern of both types (nosocomial and community associated) of strains will be performed by disc agar diffusion method.

Study of the effects of *C. roseus* root and garlic on multi-drug resistant *S. aureus* strains by: (i) Agar well diffusion technique, determination of MIC and MBC, bacterial growth kinetics in the absence and presence of herbal extracts:

Morphological deformation of bacterial strains pre- and post-exposure to treatment will be evaluated by electron microscopy;

Isolation and characterisation of plasmids of MDR strains;

Study of the effects of extracts of *C. roseus* root and garlic on *S. aureus* plasmids.

**(vi) Proposed outcome of the study:**

- i) This study will provide an insight into the pattern of antibiotic resistance in *S.aureus* in this part of the country.
- ii) The antibacterial activity of *C.roseus* root / garlic extract may be investigated further to develop an alternative to conventional antibiotics.

**(vii) Work done so far:**

- (i) Isolation and confirmation of clinical and community associated *S.aureus* strains.
- (ii) Determination of the antibiotic susceptibility pattern of *S. aureus* strains.
- (iii) Study of the antibacterial activity of *C. roseus* root and garlic extract on multi-drug resistant *S. aureus* strains by agar well diffusion technique. determination of MIC and MBC.

**References:**


1. Taussig JM. Processes in Pathology and Microbiology. 2nd Edition. Vol. 480. Blackwell Scientific Publications; 1984. pp. 518–530.
2. David M Z and Daum R S, “Community-associated methicillin-resistant *Staphylococcus aureus*: epidemiology and clinical consequences of an emerging epidemic,” *Clinical Microbiology Reviews*, vol. 23, no. 3. pp. 616–687, 2010.
3. Griffiths C., Lamagni T.L., Crowcro N S, Duckworth G. and Rooney C. “Trends in MRSA in England and Wales: analysis of morbidity and mortality data for 1993–2002.” *Health Statistics Quarterly*, no. 21, pp. 15–22, 2004.
4. S. Stefani, D. R. Chung, J. A. Lindsay et al., “Meticillin-resistant *Staphylococcus aureus* (MRSA): global epidemiology and harmonisation of typing methods.” *International Journal of Antimicrobial Agents*. vol. 39. pp. 273–282, 2012.
5. Sköv R., Christiansen K., Dancer S.J. et al., “Update on the prevention and control of community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA).” *International Journal of Antimicrobial Agents*. vol. 39: 193–200. 2012

6. National Nosocomial Infections Surveillance S. National Nosocomial Infections Surveillance (NNIS) System Report, data summary from January 1992 through June 2004, issued October 2004. Am J Infect Control 2004. 32:470– 485.
7. Klevens RM, Morrison MA, Nadle J, Petit S, Gershman K, Ray S, et al. Invasive methicillin resistant *Staphylococcus aureus* infections in the United States. JAMA 2007. 17; 298: 1763– 1771.
8. Robinson DA, Enright MC. Multilocus sequence typing and the evolution of methicillin resistant *Staphylococcus aureus*. Clin Microbiol Infect 2004; 10: 92– 97.
9. Assadullah. S., Kakru. D.K., Thoker. M.A., Bhat, F.A., Hussan. N., and Shah, A. (2003). Emergence of low level of vancomycin resistance in MRSA. Indian J Med Microbiol. 21: 196-198.
10. Kallen. A., Driscoll, T., Thornton, S., Olson, P., and Wallace. M. (2000) Increase in community acquired MRSA at a Naval Medicine Centre. 21: 223-226.
11. Show, S., Banerjee, S., Chakraborty I. and Sikdar, M. (2014). In Vitro Comparison between Antibacterial Activity of *Catharanthus roseus* and *Nyctanthes arbor-tristis* Antibiotic Resistant *Staphylococcus aureus* strain. Indo American Journal of Pharmaceutical Research. 4 (3):1487-1493, ISSN:2231-6876.
12. Show, S., Chakraborty, I. and Sikdar, M. *Catharanthus roseus*: as a Bacteriostatic Inhibitor of Antibiotic Resistant *Staphylococcus aureus* Strain . (2013). International Journal of Advances in Pharmaceutical Research . 4 (11 ): 2469 – 2474, ISSN: 2230 – 7583.
13. Clinical and laboratory standard institute.(2007). Performance Standards for Antimicrobial Susceptibility Testing : 17<sup>th</sup> Informational Supplement. CLSI Document M100-S17. Wayne, PA.

Mishra  
08/07/2016  
DR. MISHRA  
Pharmaceutical Sciences  
University  
Street, Kolkata-700 073

**Proposed Budget:**

Sl. No.	PARTICULARS	Approx. price in I.N.R.	Justification
A.	Instruments		
1.	Mini horizontal gel apparatus. .with power pack and accessories. Tarsons	50.000	Study of plasmid DNA
2.	UV transilluminator. Tarsons	65.000	Study of plasmid DNA
3.	Photoelectric colorimeter. ERMA Japan/ Systronics	15.000	Biochemical analysis
4.	Microwave oven. convection type. 21l. any reputed brand	16.000	For media preparation
	Total amount for instruments	1,46.000	
B.	Media & Chemicals	16.000	Biochemical analysis
C.	I.T. Accessories		
1.	Cartridges ( Colour & Black), Toner for printers, pendrive	6.000	Printing of papers, reports, documents, etc.
	Total amount for I.T. Accessories	6.000	
D.	Travel		
1.	36 <sup>th</sup> Annual Conference of IABMS at Shobhit University, Saharanpur, U.P. from 3 <sup>rd</sup> to 6 <sup>th</sup> November, 2016	3.500	Presenting paper
2.	Airfare. conveyance & accommodation charges for attending the above.	15.000	
3.	Registration charges for attending the Annual Conference of the Physiological Society of India. to be held at Vidyasagar University in December, 2016	3.000	Presenting paper
4.	Conveyance and accommodation charges for attending the above.	2,000	
	Total amount for Travel	23.500	
E.	Miscellaneous items for research		
1.	Publication charges	6,500	Page charges for publication in journals
2.	Charges for SEM. TEM analysis	2,000	
	Total amount for miscellaneous items	8.500	
	GRAND TOTAL	2.00.000	

  
 08/07/2016  
 Dr. M. K. Singh, Senior AR (nee BHAKTI)  
 Associate Professor,  
 Department of Biological Sciences  
 Gurukul Kangri University  
 8871, Gwalior Street, Allahabad-202 002





PRESIDENCY UNIVERSITY  
KOLKATA

PRESIDENCY UNIVERSITY, KOLKATA  
Finance Department

Memo No: PU/FRPDF/2017-18/4

Date:04-08-2017

To  
Dr. / Prof. Prabir Kr. Mukhopadhyay  
Associate Professor  
Department: Life Sciences  
Presidency University, Kolkata

With pleasure, the undersigned is to inform you that the competent authority of the University has been pleased to sanction a fund of Rs. 1,66,000/- (Rupees One Lakh Sixty Six Thousand only) as detailed below to carry out your research project titled "Molecular dissection on protective ability of dietary antioxidants against arsenic-mediated disorders of reproductive and hepato-renal systems"

Head of Expenses	Sanctioned Fund (Rs.)
Contingencies	12,000.00
Consumables	1,35,000.00
Lab & IT Equipment	12,000.00
Computer Hardware & Software	7,000.00
<b>Total</b>	<b>1,66,000.00</b>

The fund is sanctioned under the following terms and conditions:

- Compliance with the extant financial rules and Presidency University Guidelines for Purchase and FRPDF is to be ensured while utilizing the sanctioned fund.
- The fund is to be utilized within the financial year 2017-18
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- Inter-head transfer of sanctioned fund should be restricted to the amount of Rs.5, 000/- in total.

Thanking you.

Yours faithfully,

  
Finance Officer  
Finance Officer  
Presidency University  
Kolkata

  
Registrar  
Presidency University  
Kolkata

  
Director  
Internal Quality Assurance Cell (IQAC)  
Presidency University  
Kolkata-700073

**Revised Budget**

**Project Title "Molecular dissection on protective ability of dietary antioxidants against arsenic-mediated disorders of reproductive and hepato-renal systems"**

<b>Head of Expenses</b>	<b>Sanctioned Fund (Rs.)</b>
Contingencies	12,000.00
Consumables	1,35,000.00
Lab & IT Equipment	12,000.00
Computer Hardware & Software	7,000.00
<b>Total</b>	<b>1,66,000.00</b>



Signature  
**Dr. Prabir Kr. Mukhopadhyay**  
Associate Professor  
Department: Life Sciences

**Name:** Dr. Prabir Kr. Mukhopadhyay, Associate Professor

**Dept:** Life Sciences

**Working area:** Amelioration of Arsenic toxicity by dietary antioxidants

**Proposed work entitled:** Molecular dissection on protective ability of dietary antioxidants against arsenic-mediated disorders of reproductive and hepato-renal systems

**Introduction:**

Arsenic is a ubiquitously present metalloid that is present as a contaminant in ground water in many parts of the world, especially Bangladesh and India. Furthermore, its use in pesticides further contaminates agricultural land and crops. Effects of arsenic poisoning can be debilitating ranging from skin lesions to widespread organ toxicity. Reproductive system problems have also been manifested in populations drinking contaminated water, which range from infertility, low sperm counts, low birth weight, pregnancy complications to even spontaneous abortions. Intracellularly arsenic causes oxidative stress that leads to damages of lipid, protein and DNA that often lead to cell cycle arrest and apoptosis. Interestingly, people who are malnourished and from low socio-economic backgrounds manifest the worst symptoms. My laboratory focuses on the biochemistry and molecular biology of certain dietary antioxidants as possible interventions to reduce arsenic damages to tissues.

Previously we have published results on the use of a combination of proteins (high casein and pea) in reducing oxidative stress in male and female reproductive systems. A combined application of  $\alpha$ -tocopherol (vitamin E) and ascorbic acid (vitamin C) has also been effective in reducing oxidative stress in the male reproductive, hepato-renal and hematopoietic systems as seen by simple biochemistry and histological techniques. Ameliorative effect of vitamin E and C and protein supplemented diet on arsenic induced sperm cells has been noted through comet assay. From critical analysis of such work, it has been noted that mechanism of apoptosis in testicular germ cells and ovarian cells, its specific pathway, which particularly is activated in such condition



remains in gray area. Moreover, protective actions of such dietary components on cytotoxic sensors along with their specific role remain unexplored. We now intend to extend our research further to examine the effect of these antioxidants at the molecular level.

**Objective:**

To study the protective ability of dietary components in arsenic exposed rodent model. We would be assessing status and function of reproductive (male, female), hepato-renal and hematological systems. Change of redox status and extent of DNA damage and apoptosis induction in the systems/organs/cells under arsenic treated and supplemented state will also be examined.

**Methodology:**

Our animal models will be as follows.

Wister rats (130±10 gm) will be purchased from the registered breeders and will be randomly divided into following groups. They will be maintained following the ethical guidelines and sanction from the IAEC of our University:

Group I: Control

Group II: Arsenic treated for 30 days

Group III: Arsenic+ ascorbic acid+ tocopherol for 30 days

Group IV: Arsenic + high protein diet for 30 days

Group V: Pre-exposed with arsenic for 30 days+ supplementation for 30 days

The following experiments will be conducted using the above models.

**Specific Aim 1: Analysis of oxidative stress:**

Upon termination of the experimental period, animals will be sacrificed and the following will be analyzed in testis or ovary.

- i. Morphological status via histological, histomorphometric and histokinetic analyses,
- ii. Functional status at the level of gametogenic and steroidogenic levels

- iii. Oxidative stress parameters like, assessment of SOD, Catalase, GPx, GST and GSH by standard biochemical techniques.
- iv. Lipid peroxidation, protein oxidation and DNA damage by DNA ladder analysis.

**Specific Aim 2: Analyze the extent of DNA damage and protection by supplementation.**

From isolated sperm and granulosa cells, the extent of DNA damage will be analyzed by comet assay. The cells will also be used to assess the ROS generation by DCFDA technique.

**Specific Aim 3: Assessment of the status of apoptotic induction in arsenic treated and supplemented rats.**

The status of the apoptotic pathway will be analyzed by multiple experiments: Immunoblotting and RT-PCR for Bax, Bcl-2, immunoblotting for cleaved caspases-3 and 9, assessment of mitochondrial integrity by JC1 fluorescent dye. The results will denote the specific pathway/s which the supplements can possibly intervene.

**Novelty and Contribution to society:**

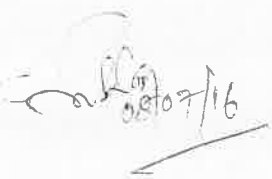
Arsenic contamination in West Bengal is so widespread that simple dietary intervention to reduce the effects is a very attractive, low cost option. So far we have already established the efficacy of simple, easily available antioxidants such as pea (*Pisum sativum*), casein (milk protein), ascorbic acid (Vitamin C, rich in citrus fruits),  $\alpha$ -tocopherol (Vitamin E, rich in fish and dark leafy greens) and lipoic acid (present in spinach and baker's yeast/ bread). This present work will examine two aspects of dietary antioxidants as food medicine: (i) whether these antioxidants have other functions within the cell or do they simply reduce oxidative stress and (ii) if these antioxidants have functions other than simply reducing ROS, will they be effective in reducing/ reversing the effect of arsenic in already exposed individuals. The answers to these questions are the key to the implementation of this research to the affected populations.

**Budget:**

Item	Funds	Justification
Animal feed (pellet):	5000	For preparing animal model
Chemicals: (common)	15000	For the purchase of molecular biology grade
(Sigma, HiMedia)	25000	chemicals (Collagenase Type I, Histopaque
(Antibody-2 nos.)	50000	10771, Proteinase K, casein fat free purified,
Plastic wares: (Tarsons)	15000	Hyaluronidase, Taq DNA polymerase, Reverse Transcriptase, primers)
Equipments:	50000	Small equipments such as weigh balance (three decimal, Wensar) and Powerpack (Tarson). The balance is needed exclusively for tissue fragment weighing.
Travel	30000	Present work at IABMS conference to be held in Saharanpur (Nov, 2016) and ISSRF to be held at Delhi (Jan, 2017)
Contingency:	10000	For miscellaneous purchases
<b>Total</b>	<b>200000</b>	

**Personnel:**

The work will be carried out by research scholar Sagnik Biswas and the M.Sc. dissertation and summer students.

  
08/10/16

Dr. Prabir K. Mukherjee  
Associate Professor of  
Dept. of Biological  
Presidency University  
Kolkata



PRESIDENCY UNIVERSITY  
KOLKATA

PRESIDENCY UNIVERSITY, KOLKATA  
Finance Department

Memo No: PU/FRPDF/2018-19/9

Date:18-01-2019

To  
Dr. / Prof. Prabir Kr. Mukhopadhyay  
Associate Professor  
Department: Life Sciences  
Presidency University, Kolkata

With pleasure, the undersigned is to inform you that the competent authority of the University has been pleased to sanction a fund of Rs. 1,85,000 /- (Rupees One Lakh Eighty Five Thousand Only) as detailed below to carry out your research project titled "Molecular dissection on protective ability of dietary antioxidants against arsenic-mediated disorders of reproductive and hepato-renal systems"

Head of Expenses	Sanctioned Fund (Rs.)
Consumables	1,60,000.00
Lab & IT Equipment	25,000.00
<b>Total</b>	<b>1,85,000.00</b>

The fund is sanctioned under the following terms and conditions:

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- The fund is to be utilized within the financial year 2018-19
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Yours faithfully,

  
Finance Officer  
Finance Officer  
Presidency University  
Kolkata

  
Registrar  
Presidency University  
Kolkata



Director  
Internal Quality Assurance Cell (IQAC)  
Presidency University  
Kolkata-700073

## Revised Budget

Project Title "Molecular dissection on protective ability of dietary antioxidants against arsenic-mediated disorders of reproductive and hepato-renal systems"

Head of Expenses	Sanctioned Fund (Rs.)
Consumables	1,60,000.00
Lab & IT Equipment	25,000.00
Total	1,85,000.00



Signature  
Dr. Prabir Kr. Mukhopadhyay  
Associate Professor  
Department: Life Sciences



10

2018-19

Name: Dr. Prabir Kr. Mukhopadhyay, Associate Professor

Dept: Life Sciences

Working area: Amelioration of Arsenic toxicity by dietary antioxidants

Proposed work entitled: (Molecular dissection on protective ability of dietary antioxidants against arsenic-mediated disorders of reproductive and hepato-renal systems )

### Introduction:

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remains in gray area. Moreover, protective actions of such dietary components on cytotoxic sensors along with their specific role remain unexplored. We now intend to extend our research further to examine the effect of these antioxidants at the molecular level.

#### Objective:

To study the protective ability of dietary components in arsenic exposed rodent model. We would be assessing status and function of reproductive (male, female), hepato-renal and hematological systems. Change of redox status and extent of DNA damage and apoptosis induction in the systems/organs/cells under arsenic treated and supplemented state will also be examined.

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The status of the apoptotic pathway will be analyzed by multiple experiments: Immunoblotting and RT-PCR for Bax, Bcl-2, immunoblotting for cleaved caspases-3 and 9, assessment of mitochondrial integrity by JC1 fluorescent dye. The results will denote the specific pathway/s which the supplements can possibly intervene.

**Novelty and Contribution to society:**

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**Personnel:**

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*Dr. Prabir Kr. Mukherjee*

Associate Professor of  
Dept. of Biological  
Presidency University  
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PRESIDENCY UNIVERSITY  
KOLKATA

PRESIDENCY UNIVERSITY, KOLKATA  
Finance Department

Memo No: PU/FRPDF/2018-19/5

Date:03-12-2018

To  
Dr. / Prof. Mousumi Dutta  
Professor  
Department: Economics  
Presidency University, Kolkata

With pleasure, the undersigned is to inform you that the competent authority of the University has been pleased to sanction a fund of Rs. 1,50,000 /- (Rupees One Lakh Fifty Thousand only) as detailed below to carry out your research project titled "Application of econometric methods to development issues, specifically ageing, gender, and health".

Head of Expenses	Sanctioned Fund (Rs.)
Computer Hardware & Software	1,50,000.00
<b>Total</b>	<b>1,50,000.00</b>

The fund is sanctioned under the following terms and conditions:

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Presidency University  
Kolkata-700073

## Revised Budget

Project Title "Application of econometric methods to development issues, specifically ageing, gender, and health".

Head of Expenses	Sanctioned Fund (Rs.)
Computer Hardware & Software	1,50,000.00
<b>Total</b>	<b>1,50,000.00</b>

*Mousumi Dutta*

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Signature  
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Professor  
Department: Economics

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# RESEARCH PLAN FOR ACADEMIC SESSION 2016-2017

MOUSUMI DUTTA

Professor, Economics Department

## 1. Research interests:

Application of econometric methods to development issues, specifically ageing, gender, health.

## 2. Continuation of research initiated in previous session:

### **2.1 Ageing:**

Currently, I am supervising a doctoral thesis. The candidate is registered at Calcutta University, and is expected to submit her thesis this year.

I am also working on assessing the financial contribution of the aged to their households using National Sample Survey Office (NSSO) data. The paper has been accepted for oral presentation in the European Population Conference to be held at Mainz, 31 August - 3 September, 2016. After receiving feedbacks, I am planning to submit the paper for publication in journals like Journal of Biosocial Science (Cambridge University Press), Journal of Ageing, Journal of Asian Studies (Taylor & Francis) from December onwards.

**The travel and other expenses for attending the conference will be covered under the FRPDF scheme (2016-2017). A budget has been submitted for Rs.1,75,795 which has been approved.**

### **2.2 Variations in gender disparity in education across ethnic groups:**

This study examines how gender disparities in school education in India vary across ethnic groups. We use a sequential logit model to study how the gender disparities change over different transitional stages in school education using NSSO data. We also propose to estimate the importance of each transition in the final outcome using a decomposition method suggested by Buis (2007). The paper has been accepted for oral presentation in the Annual Conference of the British Society for Population Studies to be held between 12-14 September 2016 at Winchester University.

**The travel and other expenses for attending the conference will be covered under the FRPDF scheme (2016-2017). A budget has been submitted for Rs.1,23,750 which has been approved.**

### **2.3 Use of behavioural contraception methods by graduate women in Kolkata**

I had undertaken a study on this topic funded by ICSSR under its Major Research Project scheme in 2012-2014. The report had been submitted to *Springer* for possible publication as a book. Springer had accepted this proposal and an agreement to publish the report signed. I have been working on the manuscript and will send it to Springer in August 2016.

**No financial support will be required.**

### **2.4 Foetal origin hypothesis**

This study, undertaken in collaboration with IIT Kharagpur and ISI Kolkata, examines whether foetal starvation leads to genetic programming and creates a pre-disposition for poor anthropometric

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growth and mid-life diseases. The analysis of the data is currently being undertaken. Early versions of the work will be presented in poster sessions at the European Population Conference to be held at Mainz, 31 August - 3 September, 2016 and Annual Conference of the British Society for Population Studies to be held between 12-14 September 2016 at Winchester University. Based on feedback we will work on possible publication in an international journal from December 2016 onwards. We will also send a complete paper for presentation in the International Population Conference organised by International Union for Scientific Studies in Population (IUSSP) to be held at Cape Town in December 2017.

If paper is accepted then financial assistance will be sought in the next session (2017-2018) under FRPDF scheme. Budget will be submitted at that time.

### 3. Studies to be initiated in this session

#### 3.1 Quality of life and economic burden of treatment among Epithelial ovarian cancer (EOC) patients

[a] Restrictive or Individualized Goal-Directed Fluid Replacement Strategy in Ovarian Cancer Cytoreductive Surgery- A prospective randomized controlled trial (RIGoROCS): This study examines the costs-benefits of integrated fluid treatment during the surgery of EOC patients at Tata Medical Centre, Kolkata. The data collection process is expected to start in September 2016 with financial support by TMC.

[b] Health economic evaluation of primary treatment of ovarian cancer: A joint proposal for a 2-year longitudinal study has been submitted along with ISI Delhi, TMC, AIMS, JNU and IIT Kharagpur to Niti Ayog, Delhi. The proposal is currently under consideration of the Ethical Committee, ISI Delhi.

[c] An economic analysis of alternative treatment methods of ovarian cancer in India: An appraisal of economic burden, quality of life and mortality risk: Jeev Daya, USA has agreed to fund a study of quality of life among EOC patients. This will be undertaken in collaboration with TMC and IIT Kharagpur. The proposal has been placed before IRB Committee, TMC.

No financial support will be required for these studies from the FRPDF scheme in this session (2016-2017).

#### 3.2 Duration of unemployment in urban India and its determinants

The study proposes to use survival analysis to study the duration of unemployment in urban India and its socio-economic determinants. I propose to initiate this study in January 2016.

The balance of the FRPDF amount (if any) for the financial years 2016-2017 and 2017-18 will be utilised in this study. This proposal will be submitted to ICSSR for funding.

Details of this study and a budget have been attached in Appendix I.

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## **Hazard Analysis of Unemployment Duration**

### **A study of Urban areas in Eastern India**

#### **1. Statement of the problem**

Unemployment duration is an important aspect which can explain the labour market dynamics in terms of the flows between employment, unemployment and out of the labour force of a country. For instance,

“...a 10% unemployment rate can represent two entirely different realities in terms of their implications for the welfare of those affected: one where every individual in the labour force experiences unemployment during 5 weeks per year and another where 10% of the population are unemployed during the whole year (Employment in Europe, 2009).”

A labour market in which few people are unemployed, but are likely to remain unemployed for a very long time, is likely to be more damaging than one in which are many more who are unemployed but remain in that position for only a short period of time. The welfare of unemployment depends on the probability or hazard of obtaining a job after leaving his/her existing job.

#### **2. Overview of literature**

In the last couple of decades survival analyses and duration techniques have gained popularity in the social sciences to model the length of unemployment spells and strike duration. Instead of standard econometric techniques applied in labour economics, Moffitt (1999) applied the proportional hazard methods and the duration models, to study the unemployment duration model. Again, the effects of different determinants of unemployment duration were studied for Canada (Green and Riddell, 1995), Spain (D'Agostino and Mealli, 2000; Arranz and Romero, 2003) applying survival analysis. Newell and Pastore (2006) apply duration models to estimate the effect of regional unemployment variation on aggregate economic restructuring in Poland. Factors of unemployment duration in Ukraine are discussed in Kupets (2006), who uses the Cox proportional hazard model with two competing risks. The author concludes that age, marital status, income during unemployment and local demand constraints significantly affect the duration of unemployment.

$$H_Y(y) = (1/\theta^\lambda)y^\lambda.$$

when  $\lambda$  is the shape parameter and  $\theta$  is the scale parameter.

Typically survival time will depend upon covariates. They can be incorporated in the model by assuming that  $\lambda$  is constant (and equal to unity) across all subjects and allowing  $\theta$  to vary across subjects (i.e. subject  $i$  has scale parameter  $\theta_i$ ). For subject  $i$  with covariates  $x_i$  we assume that:

$$\log \theta_i = \sum_{j=1}^p x_{ij}\beta_j \equiv \eta_i.$$

In this case the hazard function becomes:

$$h_Y(y) = (\lambda e^{-\lambda\eta_i}) y^{\lambda-1}.$$

Here the hazard ratio does not depend upon  $y$  but becomes an example of a more general class of models, the *proportional hazards model*, where the hazard function can be written as:

$$h_{Y_i}(y) = h_0(y) g(x_i),$$

when  $g(\cdot)$  is a non-negative function depending upon the covariates ( $x_i$ ) but not on time that can be used to assess mortality risks from the two lines of treatment.

### 3.2 Survival analysis and duration of unemployment

Steiner (201, p.93) states that 'the hazard rate from unemployment can be interpreted as the reduced form of a standard job-search model'. In the job-search model, the costs and benefits of job-search and unemployment determine the intensity of the job-search and the reservation wage of the individual. The reservation wage is compared to the offers from the wage distribution. The offers are accepted or declined depending on whether they are above or below the reservation wage. High wage offers relative to the reservation wage or low reservation wages relative to wage offers imply high exit rates from unemployment if the probability of exit from unemployment is assumed to be given by the product of the likelihood of accepting a job offer and acceptance probability. The likelihood of obtaining employment depends on individual characteristics such as gender, age, education, reservation wage, wage offer, search intensity, time spent in unemployment as well as labour market conditions, such as the local unemployment rate. These factors will form the basis of the model employed in this study.

The focus of interest in formulating the econometric model is on the probability that the spell of unemployment will end in the next short interval of time, say  $dt$ , given that it has lasted until time  $t$ . This defines the hazard function, which is a very popular way of analyzing duration data for several reasons. This model can handle censored durations as well as time-

#### **4. Research questions**

The research questions of the proposed study are:

- a) What is the average duration of unemployment? How does it vary across socio-economic groups?
- b) Do men and women have similar durations of unemployment?
- c) What are the factors determining the duration of unemployment?
- d) Do the young unemployed have greater waiting period than aged unemployed?
- e) Does the length of unemployment, in general, decrease with education?
- f) Is the duration of unemployment longer for socially backward communities?

In the study we will focus only on urban areas because unemployment is a nebulous concept in rural areas where it is possible to accommodate a non-working household member in agricultural and other family based activities.

#### **5. Data base and methodology**

The first part of the study will use National Sample Survey Office (NSSO) unit-level data from the 68th Round survey on "Employment and unemployment". The advantage of this data set is that it provides a nationally representative sample of households. The NSSO data, however, collects data on the last spell of unemployment only for those unemployed in the week preceding the survey (that is for respondents whose current weekly status is unemployed). However, survival analysis will be more accurately undertaken if the sample comprises of people who were unemployed at some point in the year preceding the survey, and are either still unemployed or who have found work after some time. Further, NSSO does not provide information on job offers received during the spell of unemployment, why such offers (if received) are declined and how the respondent engages him(her) self during unemployment.

To overcome these limitations, we propose to undertake a questionnaire-based primary study in selected urban areas of West Bengal. This will enable us to obtain qualitative information on the decisions to accept a job. We propose to use stratified purposive sampling method (with age and educational level being used to form the strata) to cover about 500 individuals from different parts of West Bengal.

#### **6. Implications**

## 7. References

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### 9. Personnel

Position	No. of persons	Emoluments (Rs)	Duration (months)	Total (Rs)
Research Officer	1	13,000	18	2,34,000
Research Investigator	4	10,500	6	2,52,000
Research Assistant	2	10,500	8	1,68,000
<b>Total personnel cost</b>				<b>6,54,000</b>

### 10. Budget

The budget for proposed study is Rs. Twelve lakhs thirteen thousand six hundred and seventy five only.

Sl	Item	Amount (Rs.)
(i)	Personnel (for details see above)	6,54,000
(ii)	Travel	1,50,000
(iii)	Data Processing	75,000
(iv)	Stationery and printing	50,000
(v)	Books, Journals, etc.	50,000
(vi)	Contingency expenses including postage	50,000
(vii)	Equipment: Laptop and almirah	1,00,000
(viii)	Overhead Charges (7.5% as per ICSSR norms)	84,675
(ix)	<b>Grand Total</b>	<b>12,13,675</b>

I am planning to apply to ICSSR for funding of the project. However, I will seek the balance of the FRPDF for 2016-2017 to fund a small pilot survey for the above survey.

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