Applications are invited from eligible candidates for the post of \textbf{Junior Research Fellow (JRF)} to work on a project entitled “Rotor Jet Micro Fibre Production Assembly for Technical Applications” at the Department of Textile Technology, Anna University, Chennai 600 025. It is a project funded by the \textbf{Department of Science and Technology, New Delhi.}

The details of the eligibility are given below:

<table>
<thead>
<tr>
<th>Name of the Post and No. of Vacancies</th>
<th>Essential Qualification</th>
<th>Duration</th>
<th>Stipend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junior Research Fellow / 1</td>
<td>M.E./M. Tech. (Textile Technology and Textile Engineering)</td>
<td>2 Years</td>
<td>Rs. 18,000 + 30% HRA + Medical Allowances as per Govt. of India (Rs.23,600/- per Month)</td>
</tr>
</tbody>
</table>

Interested and eligible candidates are requested to send their soft copy of the CV to reach the Principal Investigator on or before 22.08.2012.

The eligible candidates shall be called for written test and interview at the Department of Textile Technology, Anna University, Chennai - 600 025. No T.A./D.A. will be provided to attend the interview. \textbf{The date and time for written test and Interview will be informed to the candidates through email.}

Contact address of the Principal Investigator:

\textbf{Dr. R. Neelakandan  \\
Assistant Professor  \\
Department of Textile Technology  \\
Anna University  \\
Chennai - 600 025.  \\
E-mail: neelakandanr@yahoo.com  \\
Phone: 044-2235-9250 (Office)  \\
Mobile: 94444-11754}
**Project Abstract**

The application of micro fibre has increased in recent years in various fields like tissue engineering, wound dressing, facemask and filters, sensors devices, drug delivery, electrical devices, fuel cells and cosmetics. In general the micro and nano fibres are produced by using the electro spinning system. The usage of high electrical voltage and low production capacity of electro spinning system demands a new and alternate ways of developing the micro fibres. In order overcome the problems in the electro spinning system, the centrifugal spinning system is proposed in the present research work. The main objective of this research work is to design and develop a rotor jet fibre assembly for the production of micro fibres. The following are the major works to be carried out in the present research work.

**The applicants are requested to prepare on the following topics for the interview**

- **Polymers**
  - Elastic properties of polymers, Surface tension, Polymer viscosity, Electrical charging of polymer liquids.
- **Fibre Science**
  - Physical properties of fibers, Structure and Chemistry of fibers, Solubility of fibers, Nanofiber properties.
- **Basic Mechanical Engineering**
  - Hydrostatic pressure, Capillary forces, Reynolds number, Laplace force, Centripetal force, Centrifugal force, Rayleigh-Taylor instability, Marangoni forces, Vapor pressure, Fluid dynamics, Basic of Engineering drawing, Basics of CAD/CAM software.
- **Characterization of Textile fibres**
  - Characterization of fibre in SEM, FTIR spectroscopy and Optical microscopy
  - Tensile strength, Fiber bundle strength, Web porosity, Web contact angle, Web air and water permeability.
SYLLABUS FOR WRITTEN TEST

FIBRE SCIENCE
FIBRE MANUFACTURING – Melt spinning, Solution spinning; Gel spinning and electrostatic spinning of polymers

FIBRE PHYSICS
FIBRE STRUCTURE ANALYSIS – Supra molecular structure of polymers; crystalline and semi crystalline polymers; oriented state of polymers; structure investigation techniques; electron microscopy, X-ray diffraction, Infra-red radiation, NMR. Heat setting of synthetic filaments- Heat setting of synthetic filaments- effects of synthetic filament- effect of time, temperature, and tension on the structure and properties of heat set filaments; thermo mechanical behavior of synthetic fibers.

YARN QUALITY EVALUATION
MASS VARIATION OF TEXTILE STRANDS- Depiction of mass variation of textile strands in time and frequency domain; interpretation and significance of U% and CV% for textile strands; classification and analysis of yarn faults created by mass variation

VARIANCE LENGTH CURVES AND SPECTROGRAM OF TEXTILE STRANDS- Effect of specimen length and total length on mass variation measurements of textile strands; theory of construction of VL curve; analysis of variance length curves to understand and avoid the introduction of mass variation during the spinning operation; determination of period mass variation in the form of spectrogram; determination of theoretical wave length spectrum; comparison between normal and ideal spectrum; type of faults and their representation in spectrogram; interpretation of superimposed waves in spectrogram

TENSILE PROPERTIES OF YARN- Testing factors influencing the yarn tensile properties; measurement and application of yarn modulus; creep and stress relaxation of yarn; significance of estimating minimum yarn strength

FABRIC QUALITY EVALUATION
MECHANISM OF FABRIC FAILURE- Mode of fabric failure – tensile, tear, abrasion, slippage, bursting and fatigue; influence of fibre, yarn characteristics and fabric structure on fabric failure

COMFORT AND LOW STRESS MECHANICAL PROPERTIES - Role of transmission properties on thermal properties and thermal comfort viz., air permeability, water vapour permeability, resistance to penetration of liquid water, resistance to flow of heat and electrical conductivity; low stress mechanical properties during tensile, compression, bending, shear and buckling deformation; influence of low stress mechanical properties of fabrics on fabric handle, tailorability and sewability

FABRIC APPEARANCE AND OTHER PROPERTIES - Study of fabric appearance in terms of drape, formability, crease recovery, wrinkle recovery and pilling resistance; influence of fibre, yarn characteristics and fabric structure on the fabric appearance; evaluation of fabric properties like dimensional stability, flammability, impact resistance, absorbency

STATISTICS APPLICATION IN TEXTILE ENGINEERING
PROBABILITY DISTRIBUTION AND ESTIMATIONS- Applications of Binomial, Poisson, normal, student’s, t, exponential, chi-square, f and Weibull distributions in textile engineering; point estimates and interval estimations of the parameters of the distribution functions

ANALYSIS OF VARIANCE AND NON-PARAMETRIC TESTS- Analysis of variance for different models