

<b>Title of project/experiment/activity</b> Use of Microplotter			
<b>Location of activity</b> Cambridge Graphene Centre : Ink Lab		<b>Start and end dates</b> 24/08/2015 - continuous	
<b>Brief description (or attach procedure/protocol)</b>  The GIX Microplotter II from SonoPlot is a commercially made dispensing mechanism that acts like a pen plotter and will be used in accordance with the manufacturer's instructions after training.  This dispensing mechanism directly dispenses droplets on the substrate surface after taking the ink from small wells. This dispensing is driven by an ultrasonic pumping action at the core of a Microplotter. It is used to deposit nanomaterial dispersions on to a range of substrates including paper, glass, plastics and silicon.			
<b>Hazard</b>	<b>Effect</b>	<b>Control measures</b>	<b>Residual risk</b>
General hazards in lab	Inhalation of solvents Exposure to chemicals harmful to health	The needle contains small volumes (few drops) of water or solvent based ink which is then droplets are dispensed onto the substrate and the solvent is evaporated. The volume of each well is approximately 100µl. (Likelihood: 1, Severity: 1)  The use of various chemicals will be covered in separated risks assessments dealing with the preparation of nanomaterials inks and COSHH forms.  Gloves, eye protection and lab coat must be worn whilst in the laboratory. The Ink Lab rules will be respected.	Low risk
Mechanical: The setup has moving parts leading to potential pinch points.	User may trap fingers. Mechanical damage to equipment Finger piercing	Care has to be take when manipulating the needle of the dispenser. (Likelihood: 1, Severity: 1).	Low risk
Electric shock	Shock to user, damage to equipment	Do not get outer parts of the plotter wet. (Likelihood: 1, Severity: 1)	Low risk

**Personal Protective Equipment required [eye/face protection, respiratory protection, gloves, lab coat etc]**

Lab coat, gloves (purple nitrile) and eye protection (safety specs) required in the lab at all times

**Emergency Instructions & First Aid**

**Spillage:**

Syringe are filled and sealed in the Chemistry Lab. Spillage here can be dealt with using a standard spill kit or clean room wipes.

**Fire:**

In case of fire, the fire alarm should be sounded and fire service called. If safe to do so, the fire may be extinguished using an extinguisher containing carbon dioxide, located in the corridor outside the laboratory.

**First aid:**

General advice: Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled: If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact: Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**Any special monitoring required [e.g. hearing test, vibration monitoring, health surveillance]**

No

**Further control measures required? If yes, list with actions.**

Waste Disposal Procedures: The wells are emptied using a syringe and the ink disposed into suitable chlorinated (DCB), or non-chlorinated (all others) waste containers in the chemistry lab. The well are then cleaned in the chemistry lab.

In the case of equipment malfunction/failure: shutdown instrument from main switch or directly from plug socket.

**Biological/Laser/Radiation Approval [requires relevant Specialist Safety Officer signature and date]**

N/A



**Out of hours/Lone working**



N/A

# Department of Engineering – Risk Assessment

Ref No.

Signature to confirm that this is a suitable and sufficient assessment of risk and that stated control measures are in place. This risk assessment should be reviewed if additional risks not covered in this assessment are identified or if there is any reason to indicate that the control measures are insufficient.

<b>Name of Assessor</b> Panagiotis Karagiannidis Email: pk412@cam.ac.uk	<b>Signature</b> 	<b>Date</b> 31/8/2016
<b>Name of Supervisor</b> Prof A.C. Ferrari Email: acf26@cam.ac.uk	<b>Signature</b> 	<b>Date</b> 2/9/16

<b>Local Safety Coordinator</b>	<b>Signature</b> 	<b>Date</b> 1/11/16
<b>Departmental Safety Office</b> IAN SLACK	<b>Signature</b> 	<b>Date</b> 9 NOV 2016