Operating in a diverse range of military settings, Biomedical Scientists practising in the Royal Navy enjoy a fulfilling career, as described below.

The Regular Armed Forces Biomedical Scientists Cadre consists of 66 Biomedical Scientists, with the smallest element being the 13 Biomedical Scientists (BMSs) who represent the Royal Navy. RN BMSs work closely with their civilian counterparts at Queen Alexandra Hospital Portsmouth (Ministry of Defence Hospital Unit [Portsmouth]), at Queen Elizabeth Hospital Birmingham (Royal Centre for Defence Medicine Clinical Unit), and in military-specific roles around the world.

Military BMS Training
Tri-Service BMS Training follows a traditional route, with those who pass the BMS Selection Board undertaking a part-time accredited degree at De Montfort University (DMU) Leicester, whilst rotating through Queen Elizabeth Hospital Birmingham’s Blood Transfusion, Haematology, Clinical Biochemistry and Clinical Microbiology departments. These departmental rotations allow the Trainee BMS to develop the knowledge and skills framework that is a prerequisite to operating effectively in the military, multi-disciplinary Pathology Department.

NHS Pathology Departments do not fully replicate the Military Pathology Department in terms of equipment used and the multi-disciplinary, polytrauma care protocols which are utilised on military operations. To that end, once a Trainee RN BMS has graduated from DMU and has subsequently become registered with the Health and Care Professions Council, he or she must undertake the 14-week full time Military BMS Course. This is supplementary training, which comes to the fore when the RN BMS is called-upon to practice in a diverse range of military settings.

Pre-deployment Training
Whether named on a Force Elements Table (FET) for a Force Elements at Readiness (FE@R) Commitment (e.g. Role 2 [Afloat], Commando Forward Surgical Group, Primary Casualty Receiving Facility), nominated to deploy to Op HERRICK, or to join HMS ILLUSTRIOUS as a member of the Ship’s Company; the RN BMS must successfully undertake the following profession-specific training and courses:

• Blood Donation, Storage and Supply:- a 1-week course which is conducted at the Defence School of Healthcare Studies, Birmingham; all military BMSs must pass this course once during their career.
• BMS Operational Training:- a 2.5 week course which is run at the Defence School of Healthcare Studies, Birmingham; where the military BMS’s aptitude for deployment is assessed. Qualification remains extant for 2 years.

Military BMSs deploying as members of the UK Role 3 Hospital, Camp Bastion (UKR3 Hosp) have to undertake and pass MCS®+ User (‘Platelet Apheresis’) Training at the Army Medical Services Training Centre, Strensall, with their aptitude for deployment to Op HERRICK assessed at both HOSPEX (Mission Specific Assessment) and HOSPEX (Mission Specific Validation).

Operational Roles
Role 1, in HMS ILLUSTRIOUS.
As a permanent presence on HMS ILLUSTRIOUS, the singleton RN BMS:

• Runs a small laboratory within the ship’s Sickbay, providing pathological support to the ship’s company.
• Assists in the day-to-day running of the Sickbay.
• Is second in command of the ship’s Medical Headquarters at Action Stations and at Emergency Stations.
• With regards to Environmental Health and Infection Prevention & Control, provides advice to the Ship’s Command, and
• Maintains an Emergency Donor Panel (EDP) [EDPs are discussed later in this article].

When the ship is deployed as a part of the UK Response Force Task Group (UKRFTG), the BMS’s customer group expands to include the whole UKRFTG’s strength, with an obvious potential for his or her workload to increase significantly.

Royal Navy / 3 Commando Brigade Royal Marines
Role 2 Medical Capabilities
At Role 2 Medical Capabilities, the principal responsibilities of BMS personnel are to provide a life-saving Blood Transfusion Service and a Point-of-Care Testing (POCT) Blood Science Service to casualties undergoing Damage Control Resuscitative and/or Damage Control Surgical procedures. The BMS(s) often adapt and improvise in order to make the workspace allocated as conducive to Role 2 Pathology as possible and implement various adjustments,
in order to ensure that their pathological equipment operates in extreme environments. Whilst utilising pathology equipment as part of the CFSG inside the Arctic Circle, for instance, particular attention is required to ensure that the sensitive equipment is not damaged by the extreme weather during transit. Extended temperature-stabilisation times must be factored in, ensuring that the instruments are at their correct operating temperatures and thereby guaranteeing quality results in the patient setting. The modern, ‘ruggedized’ blood storage containers used to transport red cell concentrate operate in extremes of temperature, but they are continually monitored by the BMS to ensure that they maintain the critical temperature range for the blood components therein.

**Role 2 (Afloat)**

RN BMSs have recently been deployed in singleton, Role 2 (Afloat) roles on board RFA FORT VICTORIA, in her role in support of counter-piracy operations, and in HMS OCEAN, when she was supporting NATO Operations off the coast of Libya.

During Exercise CORSICAN LION in 2012, HMS ILLUSTRIOUS was validated as a Role 2 (Afloat) Platform, with the Ship’s Company BMS (CPOMT[L] McLennan) and the Role 2 (Afloat) BMS (POMT[L] Doran) combining the Role 1 and Role 2 attributes at their disposal, in order to provide the most effective Pathological Service possible.

**Role 2 (Light Manoeuvre)**

There are 2 BMSs on the current Commando Forward Surgical Group (CFSG) FET, both of whom are ready to deploy in support of the Lead Commando Group. Within the past 18 months, the CFSG has undertaken three large-scale exercises and a bespoke deployment to Gibraltar.

**RN BMSs Operating at Role 3 Medical Capabilities**

The **UK Role 3 Hospital, Camp Bastion (UKR3 Hosp)**

The most manpower-intensive operational commitment for military Biomedical Science exists at the UK Role 3 Hospital in Afghanistan. At the time of writing, two RN BMSs are deployed as members of the facility’s Joint Service, 8-man Pathology Department Team (5 UK BMSs, 2 US Laboratory Technologists plus 1 Civilian Microbiology Specialist BMS).

The Pathology Department manages a very significant workload, with specimens being submitted by the hospital’s Secondary Care Departments, by the integrated Primary Healthcare Facility and by Forward Operating Bases and Patrol Bases throughout Helmand Province. The Pathology Department processes its workload with the assistance of innovative, semi and fully-automated Clinical Biochemistry, Haematology...
and Coagulation Studies analysers. Specimens that the department does not have the capability to process are referred to Queen Alexandra Hospital Portsmouth.

The UK Role 3 Hosp regularly activates the Surgeon General-endorsed Operational Massive Transfusion Protocol (MTP), which facilitates an aggressive approach to massive haemorrhage. Massive Transfusion was formally introduced to Defence Medical Services’ Practice in 2007 (1) and “…is credited with contributing to the improved survival of the severely injured” (2).

The MTP incorporates the infusion of red cell concentrate and fresh frozen plasma, given in a ratio of 1:1, with one or more units of Platelets and Cryoprecipitate utilised at an early stage. The MTP is flexible, with clinicians giving close consideration to the patient’s clinical picture and interpreting results and data provided by the Pathology Department and the Point-of-Care ROTEM® (thromboelastometry) technology, in order to tailor blood component therapy (3).

The Medical & General Supplies Blood Supply Team, based in Birmingham, sources and ships Red Cell Concentrate (RCC), Fresh Frozen Plasma (FFP), Cryoprecipitate (Cryo) and Platelets (Plts) to the UK Role 3 Hospital. However, there are foreseeable logistical challenges that the hospital has encountered and may encounter in the future: for instance, the distance of the UK from Helmand Province; the short shelf-life and stringent storage conditions of units of platelets; hindrance to air journeys due to the presence of ash clouds; and other times and reasons when demand would outstrip levels of stock. To cope with and plan for these contingencies, the Pathology Department perpetually maintains an Emergency Donor Panel (EDP).

There is never a shortage of military and civilian contractor volunteers willing to become members of the UK Role 3 Hospital EDP. Those pre-screened and subsequently accepted onto the EDP have previously been called forward to donate units of whole blood and/or platelets, the latter via Platelet Apheresis. Blood donations are drawn at the hospital utilising the same procedures as those which are practised at NHS Blood & Transplant Donation Centres; indeed, the same legislation is adhered to.

Amidst the high-profile developments that have been made in Polytrauma Care, for example the introduction of Massive Transfusion, it is important to emphasise the fact that the UK Role 3 Hospital Pathology Department provides an extensive Clinical Microbiological Service, with access to a Class 3 Safety Cabinet and incubators.

A significant proportion of the patients admitted into the hospital are local nationals, and the facility’s BMSs diagnose endemic conditions such as helminth faecal parasite infections, protozoan faecal parasite infections and Plasmodium vivax infections, on a common basis. Increased experience of such diagnoses can only prove beneficial to the military BMS personnel, as well as the patients, in increasing their exposure to tropical medical conditions as the Defence Medical Services prepare to return to contingency.

The Primary Casualty Reception Facility (PCRF)
The Royal Navy’s largest medical asset is The Primary Casualty Reception Facility (PCRF), which is established on board RFA ARGUS and has recently undergone re-fit. The PCRF has a 108-bed capacity comprised of 4 ED Beds, 4 OT Beds a 10-Bed Intensive Therapy Unit (ITU), a 20-bed High-Dependency Unit (HDU), and 70 Medical / Surgical Ward beds.

At optimum manning, the PCRF Pathology Department’s strength would consist of 8 BMSs, a Consultant Haematologist and a Consultant Microbiologist, providing a service which is comparable to that provided by the UK Role 3 Hospital Pathology Department.

Career Opportunities
Whilst they must maintain and enrich their multi-disciplinary knowledge and skills framework, RN BMSs are encouraged to specialise into Clinical Biochemistry and/or Haematology with Hospital Transfusion Practice and/or Clinical Microbiology. There is the opportunity to undertake formal postgraduate study, for instance a Master’s Degree programme; to undertake Research Secondments; and there are opportunities to teach at the Defence School of Healthcare Studies in Birmingham.

Although the RN MT(L) Branch is not headed by commissioned officers, in recent times several RN BMSs, including one of the authors, have been commissioned into the cadre of RN Medical Services (MS) Officers. Indeed the current head of the MS Branch is a former BMS.

Summary
In summary, RN BMSs enjoy a fulfilling career, with variety and opportunities aplenty!

References

Authors: Petty Officer Medical Technician (Laboratories) J Doran, Royal Centre for Defence Medicine.
Lieutenant T Thurgood RN, Defence Medical Services Training Group.