

**The Royal Institution
of
Naval Architects**



**Women in the Institution
1919 - 2019**

The Royal Institution of Naval Architects

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Foreword by the Chief Executive

At the 1919 AGM, it was agreed that women should be eligible to become members of the (then) Institution of Naval Architects on the same terms as men. The first women to be elected were Eily Keary, Rachel Parsons and Blanche Thornycroft, whose professional achievements are described in this commemoration of 100th anniversary of that decision in 1919. I am sure that throughout their careers they would have wished to be judged as professional engineers, rather than as women engineers, or even pioneers. However, when viewed in the context of the attitudes towards women in both society and the maritime industry in 1919, their professional achievements before and after their election are all the more remarkable. They were indeed pioneering women engineers in the maritime industry.

In 2019, women members of the Institution occupy a wide range of appointments in the maritime industry, academia and organisations world-wide, in both engineering and non-engineering roles. They were invited to describe their experience of being a woman in the maritime sector, why they chose to embark upon such a career, what they have achieved, what they see for the future of women in the maritime sector and whether they would recommend it as a career for women and girls today.

In all cases, they do not regret their choice of career, and are rightly proud of their achievements as professional engineers, rather than as women. Their experiences aptly demonstrate the significant change in attitudes towards women in the maritime industry, albeit also demonstrating that there may be some way yet to go. I am sure that Eily Keary, Rachel Parsons and Blanche Thornycroft would be proud of the achievements of those women members who followed them. I am also sure that whilst they would not wish to take credit for that change in attitudes, undoubtedly they and the women members since 1919 have all, by their example, contributed to that change, as women members today continue to do. The first step in a long road is always the most important, and their example as valuable and valued professional engineers in the maritime industry was that step.

Today, the Institution is fully committed to providing all who are involved with or interested in the maritime industry with equal opportunity to engage fully with all the Institution's activities. It is also committed to encouraging those organisations with which it engages to provide the same equality of opportunity. The decision of the members in 1919 was a significant step in achieving such equality.

Acknowledgements:

I am grateful to those all those members who contributed to this publication by describing their professional experience as a woman in the maritime industry today, and to Jo Stanley, Keith Harcourt and Mark Barton who have written about the first women members. I am particularly grateful to Jo Stanley, not only for her article on Women in the Maritime Industry, but also for drawing my attention to the fact that 2019 was the 100th anniversary of the Institution's admittance of women members under the same conditions as men, which led to this publication.

Trevor Blakeley



Women in the Institution: 2019-2019

Preface

by Dr Jo Stanley FRHistS, FRSA, AssocRINA

“Gender equality’s wonky course in maritime history”

In the foxed fragile pages of the 1921 census’s occupational tables something like a unicorn is visible: the solitary figure “1” appears in the “naval architects, female” column. That “1” appears again in 1931. As a historian of maritime women I’d always thought this was surely an administrative error by a census enumerator. Maybe this alleged woman was a copyist in a drawing office? Or perhaps she was a cleaner who had been placed in the wrong category? For decades ago I certainly hoped she was really a naval architect. However, the available contextual information suggested, regrettably, that this mysterious woman was too anomalous to be true.

After all, this was a time when no women at all were allowed to serve in ships of the Royal Navy. (The breakthrough was in 1990). Even in the more egalitarian merchant service, where women had been part of the work force since at least 1821, they numbered less than one per cent workers until the 1950s. Sometimes exceptional daughters of ship-owners became masters and may have been involving in commissioning small vessels. But the majority – ship’s stewardesses, or typists in the grand headquarters operated by liner operators such as Cunard and Union Castle – had no more say in their vessels’ construction than a newt is allowed a say in electricity pylon design.

RINA kindly gave me access to its archives so I could look up the history of Eily Keary, a naval architect. The research is part of my long crusade to retrieve women’s maritime history. Leafing through the pages of the *Transactions*, uncalled-for calculator in hand, I found the first three women to join INA in 1919: Eily, Blanche Thornycroft and Rachel Parsons. Trouble is, they remained the *only* women until 1955. This inequality reflects the industry’s wonky progress in including women, and not bias by the Institution. It became clear that that the solo woman naval architect I’d seen and hoped for years ago in those 1921 and 1931 statistics must indeed be one of these three – and that therefore the census had worsened the picture.

Exploring RINA’s history I’ve learned that actually women contributed to even earlier naval architecture. Anecdotal evidence, not stats, says so. At least one woman worked in the Samuda Brothers’ cutting edge Isle of Dogs shipyard from 1843. Either Abigail or Sarah Samuda – or maybe both – were in the business of developing the first iron steam ships, including for the Royal Navy. One of most significant RINA-members- who-never-was is Susan Denham Christie (later Auld). Before and during WW2 this unusual graduate of Armstrong College worked in the design office of her family’s firm, which ultimately became the famous Swan Hunter yard.

Only in 1954 did a newcomer, Barbara Hales, follow in the footsteps of INA’s three pioneers. You couldn’t say that floodgates opened. A trickle, yes. By 1975 women members (of all categories) had increased to seven, which was less than one per cent of the total membership at the time. Such slow starts are far from unusual in the history of women’s work, especially those in STEM careers.

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I'm pleased that RINA and Trevor Blakeley have genuinely welcomed my findings on women's participation. And it delights me that the Institution is celebrating the pioneering Eily with an Award in her name, rather akin to Nautilus International's Victoria Drummond Award for women. New publications are championing all three INA path-breakers, at a time when women in scientific life are being celebrated as never before. And it's exciting that the centenary of women's entry in what is now RINA has triggered this booklet. Trevor's diligent pursuit of modern women's stories corrects the skew, and enriches the skeletal early fragments. Taking the long view it's clear to this historian that women's place in naval architecture will never again be miscalculated.

Jo Stanley



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Opening Proceedings of the 1019 Annual General Meeting

Thursday, April 10, 1919

The **Chairman** (Engineer Vice-Admiral Sir Henry Oram, K C B F R S, Vice- President):

Ladies and Gentlemen, before we proceed to business, I would like to explain why I am occupying the Chair to-day. It is by request of the Council, and due to the unavoidable absence of the Marquis of Bristol

The first business is that referred to in the last paragraph of the Annual Report of the Council, that is, the proposed alteration of the bye-laws, which, if carried, will permit the admission of women to this Institution on the same terms as men. This matter has been before the Council several times, and finally, as you know, a referendum has been taken of the members with the result given on this leaflet, which you have all had, I think, showing a very large majority in favour of the admission of women. The war has shown us what women can do in certain fields of activity which are usually occupied by men, and I think it must be admitted, that the case for women as regards this Institution has been put forward in a very constitutional manner

I will now call upon Sir William Smith to propose the resolution

Sir William E Smith, CB (Vice-President):

Mr Chairman, Ladies and Gentlemen, I have a very pleasant task allotted to me this morning, namely to propose certain alterations in our rules which, if approved – and personally I have not the slightest doubt that they will be approved - will admit of women being enrolled amongst the various grades of our membership according to their technical qualifications

It is very pleasant to me to be able to propose this, because, quite apart from what our Chairman has said as regards the work of women generally in war matters, I have had an opportunity of seeing, in one particular instance in connection with Naval Architecture, the way in which women have been able to help us. I am associated with the National Physical Laboratory at Teddington. We heard yesterday from Sir Eustace d' Eyncourt of the great assistance the Admiralty have had from their own tank at Haslar under the superintendence of Mr R E Froude, and he also referred to the help the Admiralty received from the National Tank at the laboratory at Teddington, and their anticipation of similar good work and help in the future.

We had last year a paper written jointly by Mr Baker and Miss E M Keary, who is associated with the Tank at Teddington, a paper which was, I think, an exceedingly good one. It broke new ground, and gave us very great information as to the variation in the transverse stability of a vessel when proceeding under way, in comparison with her stability when at rest in still water. This is only one of many instances in which women have helped at Teddington, both in the Tank and in other departments. It was said quite truly yesterday that without the British Royal Navy the war could not have been won. It is absolutely true and equally proper to say on the present occasion that without the work done by our women the war could not have been won. The women did not seek the opportunity afforded by the war of showing what they were capable of doing. The opportunity occurred, and they rose to it and did good work, without which the war could not have been won. In the execution of what they regarded as their duty, they have shown themselves capable of doing valuable work for the country, and

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had it not been for that opportunity, and our requiring their help, we should not have known what they really can do.

My function this morning is simply to propose the following alterations in the rules. As the Chairman has said, a referendum has already been sent to all members on the subject, and there was an overwhelming majority in favour of admitting women to our Institution in strict accordance with their technical qualifications on exactly the same terms as men are admitted. That decision has to be given effect to by the General Meeting, formal notice of which has been given to our members in accordance with our rules. I propose, therefore, that the following words shall be added to Bye Law 1:-

“ 1. Each class shall be open alike to men and women.”

and also that the following words shall be added to Bye-Law 47 of the Institution:-

“**47. INTERPRETATION.** In these Bye Laws and also in the Regulations of the Institution, words importing the masculine gender only shall include the feminine gender.”

We have sought the advice of our solicitors in order to put this matter in strict legal shape, and this is the form it has taken. I propose, therefore, that we confirm the overwhelming majority which has already been reached by the referendum circulated to members, by adopting these alterations in our rules.

Sir Alfred Yarrow, Bart. (Honorary Vice-President):

Mr Chairman, Ladies and Gentlemen, I am greatly pleased to second Sir William Smith's proposal that ladies be admitted as members of this Institution on equal terms with men. I only wish that this had been proposed and carried thirty years ago. I think my life would have been much happier, because, imagine making drawings of a ship and having a young lady help you!

It may perhaps interest you to know that Mr. Saluda's sister sometimes made the drawings for the lines of her brother's ships, and I cannot imagine any better occupation for a scientific lady, than to settle the form of a ship below the water by experiment, and to determine graceful lines above the water by her taste. Some twenty-five years ago. I proposed that a lady should be admitted as a member of this Institution, but I got such a volley of abuse that I felt quite fortunate in getting out of the room with my life.

A little while ago we had a joiners' strike. The joiners came into the office and expressed their regret that they had to go. They stated that they were perfectly satisfied with the employment at our works, but they went out by order of their Union. We had a lot of women joiners who did not join in the strike. They were started on joiner's work in one of the destroyers. They made a magnificent job of it, and the boat was accepted by the Admiralty without demur. That shows what women joiners can do.

The last destroyer we tried attained during four hours a speed of 39.6 knots, fully equipped. I think that is the best speed that has ever been attained. The lines of that ship were determined partly by a young lady, Miss Keary, and I think that is a very fine recommendation in favour of ladies. We all know what a wonderful amount of work women have done towards winning the war, and if women have not in the past shown what they were capable of, it was because the circumstances did not admit of their showing their full capabilities. Circumstances bring

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out character, and the war has brought out the character and ability of the women of Great Britain.

You will all agree with me that the women of this country by their actions have earned the appreciation of men to a far greater extent than they ever had before. I am quite sure therefore, that everybody in this room will be unanimous in their vote, and we shall feel, as a Society, a pride in having ladies to share the labours of the Naval Architects

(The Chairman then put the Resolution, which was carried unanimously.)



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What *The Engineer** said about the first women members

**The Engineer* was founded in London, in January 1856, as a technical magazine for engineers.

“The decision to admit women as Associates of the Institution of Naval Architects, which was announced at the 1919 Annual Meeting, held on April 9, 10th, and 11th, opens all of the leading Institutions of the kind in the world to women. What has been done is not to be regarded in any sense as a concession to agitation, but is the outcome of spontaneous recognition of the part of the Council, whose policy has been warmly endorsed by members, that some of the work done during the war period in the field naval architecture by women deserved the acknowledgement which has now been made.

The first names to be placed on the roll of the Institution in pursuance of the rule adopted are those Miss EML Keary, who has acted as junior assistant at the William Froude National Tank on general research work ; Miss RM Parsons, who bears an honoured name in the marine engineering world, and who is "chairman" of the Women's Engineering Society; and that of Miss BC Thornycroft, a member of the distinguished family of that name, who while in charge of experimental tank work has carried out many important investigations and has directed special attention to high-speed skimmers.

It is true that as the Institution has been incorporated by Royal Charter, the roles cannot be altered without the consent of the Privy Council, and the sanction of that August body has therefore to be obtained before the rule admitting women to membership becomes effective. This asset is not in the least likely to be withheld”.



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Eily Marguerite Leifhild Keary MRINA

Born in London in 1892, Eily Keary went to Roedean School from 1908 to 1911, where she benefited from this new-style education for girls, which supported sports, maths, science, and useful public careers for women, not just wifehood.

In 1912 she entered Newnham College, Cambridge which had opened mathematics to women in the 1880s. She gained a Class II degree in 1915, but gendered rules meant no women could formally be awarded a degree on the same basis as men for another 33 years. She is believed to be the first woman to complete a Mechanical Science degree. The cutting-edge course brought the women pioneers into direct contact with the decade's leading technological innovators.

After leaving Cambridge in 1916, Keary worked at the William Froude laboratory ('the National Experiment Tank') at the National Physical Laboratory in Teddington. The Tank had only started in 1911 and was presented to the nation by ship-owner and RINA official Sir Alfred Yarrow. Fortuitously for women, the NPL became severely short of employees in WW1, a time when many bright young women graduates were being accepted into non-traditional niches. Also the philanthropic Yarrow was very supportive of women in STEM careers.



Photo courtesy of Peter Smith-Keary

She described her role as 'junior assistant'. At the Tank, as at Cambridge, she was well mentored, this time by the professionally acclaimed George S Baker, a leading model ship researcher with whom she later co-authored the first paper by a woman to be published by the Institution. Her solo paper was be "*Manoeuvring of Ships: Model Experiments of Rudder Forces under Service Conditions*", which she presented to the Liverpool Engineering Society in 1925. Although it was traditional in learned societies for men to read aloud women's papers on their behalf, she presented her own.

'Educated women', it was freshly realised, were suited to 'scientific work which does not involve hard physical exertion', such as making calculations', said Sir William Reardon Smith in early 1918, acknowledging Keary as contributing the very first Institution paper by a woman. She co-wrote 6 papers with Baker about the Tank's findings and activities in the Institution, which she had joined in 1919. Also interested in aeronautics, she published remarkably early in her career, at a time when some senior men took credit for juniors' or women's work.

Her research included the hydrodynamic properties of ship's hulls and the new seaplanes and flying boats, focusing on such problems as wave making resistance, the rolling of ships, and the properties of screw propellers. She worked with models of ships, which were 14-20 foot long and made of Princes' paraffin wax. Researchers could sit on and test them, at speed, in the 549-foot-long tank that replicated water movement. When, after research at the Tank, a

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new destroyer was built that could do the fastest speeds ever (39.5 knots) Yarrow announced 'the lines of that ship were determined partly by a lady, Miss Keary, and I think that is a very fine recommendation in favour of ladies.'

Eily Keary did not vacate her employment after WW1, as did most women in 'men's jobs, but instead continued at the Tank until 1930. Following her marriage to Frederick Edmond Smith, she resigned that year. She died in 1975.

The work of all tanks, especially at the NPL, was globally crucial in ship design before computerised simulation. As an NPL Tank researcher, Eily Keary made a significant contribution to finding ways to ensure seafarers' safety as well as the efficacy of a range of ships throughout the world.

Together with Blanche Thornycroft and Rachael Parsons, Eily Keary was the first woman to be elected as an Associate of the Institution; the first woman Associate Member in 1923; and RINA's first female full Member in 1973. She was also the first married woman and first mother to join the Institution.

Dr Jo Stanley FRHistS, FRSA, AssocRINA

The first paper by a woman to be published in the Transactions

The first paper by a woman to be published in the Transactions was by Mr G Baker and Miss E M L Keary, and was entitled "*The Effect of the Longitudinal Motion of a ship on its tactical Transverse stability.*"

In the published Discussion of the paper, Sir William Smith said.... "This paper is not only the first of its kind as regards the subject matter, but it is the first to be contributed to our Transactions (if only in part) by a lady. From the general tendency of the times it is evident that we have a very large amount of work ahead of us much of which can quite well be performed by educated women. I have in my mind such matters as the analysis of steam trails, the analysis of ship form, calculations of displacement, stability, etc, and all sorts of similar scientific work which does not involve hard physical exertion. I am perfectly certain that as time goes on we shall be more and more dependent for the prosecution of the work we have in hand on the assistance we may be able to receive from educated women such as I refer to.

I am quite sure you will all agree with me that this is a very valuable paper and that the thanks of the Institution are due to Mr Baker and Miss Keary for presenting it to us."



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Rachel Parsons

Rachael Parsons' interest and aptitude for engineering and science was fostered from a young age by the engineering tradition in her family. Rachel was the daughter of Sir Charles Parsons, who was one of the key developers of the steam turbine, which at this time was dominating propulsion in the Royal Navy. Rachel, along with her brother Tommy and mother Katharine, participated in her father's experiments at home. This also involved models on the pond at the family home. It was the experimental Parson-designed Turbinia that demonstrated the importance of this propulsion change when she raced past the RN ships at the 1897 Spithead Review. This meant that Parson steam turbines were adopted as the propulsion system for HMS Dreadnought. Rachel would accompany her father onboard the Turbinia whilst the ship was undergoing various trials after its launch.

Rachel Parsons was educated at Roedean, one of the very few schools at the time that taught science to girls. In 1910, Rachel was one of the first three women to study Mechanical Sciences at Cambridge University, but in common with other female students, she was barred from taking a degree.



Her brother worked in the family firm Parsons Marine Steam Turbine Company in Newcastle-upon-Tyne. However, he enlisted during World War 1 and was killed in 1918. While he was away, Rachel was appointed an interim director, taking charge of the growing cohort of female employees. She also joined the training division of the Ministry of Munitions and was responsible for instructing thousands of women in mechanical tasks. She became a leading member of the National Council of Women, and campaigned for equal access for all to technical schools and colleges, regardless of gender. When the war ended, her father refused to let her continue, causing a family rift. Rachel resigned but was determined to continue in engineering.

After the war, when women were told to go back to the home, Rachel started a campaign to promote women's employment rights and with the support of her mother, she founded the Women's Engineering Society which promoted the retention of women engineers after the end of the First World War as well as supporting engineering as a career for women. Rachel Parsons became its first President in 1919. In 1920, she was one of a group of eight women who founded Atalanta Ltd, an all-female engineering company, which included further technical education for its employees during the eight years of its operation.

Rachael later moved out of engineering into politics. She died in 1956.

Mark Barton



Women in the Institution: 2019

Catherine Ingram MRINA

I was in part inspired to pursue a career in engineering by a slightly older friend who studied chemical engineering and at 21 was working on oil rigs. She frequently spent several weeks as the only women living on a rig and I was inspired by her passion for her work and the seemingly adventurous life she led. It is with experience I can understand just how isolating that must have been.

Less than 50 years ago equal pay became a legal requirement, and I can only imagine how it would feel to know your work was valued less than that of your colleagues based solely on gender. I have heard stories of corporate "Gentleman's" clubs from this period who (begrudgingly?) permitted women to join but with the indignity of only being permitted to enter the club house through the side door. While I admire the strength of the women who pursued and thrived in technical careers despite such blatant injustices, I am thankful that in my career those inequalities are a historical curiosity rather than a daily battle.

Being a minority in the work environment does come with challenges. There are practical challenges with overalls that will never fit dockyards where the nearest ladies facilities are half a mile away or finding a place to change when visiting a ship. There are social challenges of being "the odd one out" that can lead to conflict over whether you "belong" and a feeling that colleagues just don't understand how the work environment seems to you. There can be assumptions that you would never want to go for a beer or that you are the office secretary. Even when people are not so blatant as to assume the only lady in the office is the secretary, there can still be an assumption that, regardless of role, they will take the minutes, sort the lunch and undertake other stereotypically feminine tasks. There are also professional challenges as we strive for equity in a culture that can seem to disproportionately value traits regarded as typically male over those more typically female.

At BMT I am proud to be a part of an organisation that understands the importance of diversity and sees that this benefits everyone, not just the minority, as well as the bottom line and our society in general. I am grateful to the women and men who have and do support me in my career, and as my career develops I am thrilled to be able to support younger engineers. I am excited to see changes in corporate culture as we move away from simply striving for equality in pay etc. to fostering an environment where there is true equity for all.

Role models are important in career development, and while role models can be anyone, in my experience it is easier to relate to someone of the same gender. I believe RINA can play an important role in bringing together naval architects, in particular those working for smaller companies, to show that we do have talented women in our profession who have fulfilling careers and who demonstrate to others what can be achieved.

I have been told on several occasions in my career that gender is not an issue. My hope is that in another 100 years this will be unequivocally true and equality in our profession and society will be innate such that the initiatives required today will seem as ridiculous to that generation as only letting women in through the side door seems now.

Catherine Ingram



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Catriona Savage FRINA

Although I'd been around the sea from a young age, my real passion for sailing took hold as a teenager when I got involved with The Seamanship Foundation (now part of Sailability), both through their young people development programmes and as a buddy for people with disabilities. During my A-levels I decided I wanted to combine my interest in ships and boats with the maths and physics I enjoyed most at school. After searching in the school careers' library, I worked out what it was I wanted to be and then spent much of my time explaining what the obscure skill set of "Naval Architecture" was to my teachers, family and school friends.

I started my undergraduate course at Southampton University and in my first term was made aware of the bursary opportunities made available by the Royal Institution of Naval Architects. As well as becoming a Student Member, I received receiving a bursary for the 3 years of my BEng in Ship Science. I followed my BEng with an MSc in Maritime Engineering Science, also at Southampton University, and subsequently was offered a job at BMT Defence Services (now part of BMT Defence and Security) in Bath.

My first goal on joining BMT was to work towards achieving the requirements of the Engineering Council and RINA to become a Chartered Engineer through their RINA accredited training and development scheme. I was lucky enough to work on a wide variety of projects and gained increasing responsibility during this time. Whenever the opportunity arose I also took advantage of placements in other organisations, ship visits and surveys to both broaden and deepen my experience. As I progressed through the organisation I started to line-manage teams of engineers, eventually becoming Head of Naval Architecture and subsequently a Fellow of RINA. Less than two years later the post of Technical Director became available and I applied without hesitation. I was successful and became responsible for a team of around 275 Engineers covering Naval Architecture, Naval Engineering, Combat Systems, Systems Engineering and Information Systems as well as leading the company R&D strategy. My time at BMT allowed me to work on projects covering design, In-service support and disposal as well as with ships and submarines.

I left BMT after over 20 years to join the UK MoD specifically to take the position of the UK MoD Chair in Naval Architecture at University College London. This is a very unique position as opportunities to transfer between industry and academia are limited. I very much enjoy developing our future Naval Architects as well as being a part of the cutting edge research which we conduct in the Marine Research Group.

Alongside my work as a Naval Architect I have spent many years contributing to the Naval Architecture community through support to Engineering Institutions, STEM and diversity initiatives. With regards to RINA this has been as a member of the Equality, Diversity and Inclusion Working Group, Chair of the Membership Committee, member of the Council and as a Trustee on the Board. I find it very rewarding to have the opportunity to give back to the community and encourage the next generation to consider engineering, and more specifically maritime, as a future career choice.

If I was going to pass on one piece of advice to others, it would be to always have a mentor (or some mentors). I can never thank those who've mentored me enough for the positive impact they have had on me and my career.

Catriona Savage



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Christina Douka AMRINA

I decided to study Naval Architecture out of a passion for the sea and an interest in the way things are made. Although I already knew it, I very soon experienced how heavily male-populated is the maritime field, from the low number of girls in the university classroom to the inappropriate coverall and shoe sizes – especially for a 5’3” frame.

However, fewer as they may be, the women in the field are more than capable of holding their own, and I am proud to count myself one of them. My first role was as structural analyst in a classification society, where I had many female colleagues, as Class is a career choice for many women naval architects. My team alone was comprised of 40% women; prompting at some point upper management to enquire “why there are so many admin staff in this department”? I have old and new friends in similar positions, and we all enjoy the challenge of making a ship model come to life from black-and-white drawings.

I still do this unusual type of “modelling” in my current position in a consultancy, but I have also gained new experiences. Consultancy work is fast-paced and ever-changing; I never know what new challenges may come, or where!

I visit the ports of Kent at all times of day and night and regularly work with the chief officers and master mariners, who are always happy to have me there. On one memorable occasion I was attending a cruise ship on an exceptionally long dry dock, which had to be extended even more; a category 5 hurricane was approaching and we had to abandon the dry dock for safety. It came down to me to determine how the ship’s stability had changed in five days of refit. To achieve this I liaised with everyone involved in the project: the multilingual refit contractors, the company management team and the captain and deck officers. We all worked to the best of our abilities and the sole goal of our collaboration was a successful outcome.

Ultimately, the only thing that matters is the professional capability to do the job, the technical knowledge, problem-solving, attention to detail, project management, tenacity and continuous improvement. All attributes which are irrelevant of gender, but which are prominently present in the admirable group of women engineers, in which I belong.

Christina Douka



Women in the Institution: 2019

Cristina Barba Fau

I really do not know when I decided to become a naval architect. What I do know is that since I was child, boats and sea have been always next to me. When I was child in Spain I used to go to the “Palacio de Pedralbes” park with my Grandfather to play with my sister’s remote controlled boat in the fountain. I started doing sailing courses during summer when I was six years old. For several years my family and I used to go to Menorca and rent a boat. At 17 years old I started to participate in sailing regattas and when it was the time to decide my choice of the university, I chose to be a naval architect.

I studied at Facultat Nautica de Barcelona and after my Bachelor degree I went to La Spezia to do my Masters degree at Polo Universitario G.Marconi. During those years at the University, I worked for Barcos Deportivos shipyard and for YS&T naval architect consultant office.

My duties during the first weeks at Barcos Deportivos were helping the HR & Procurement Department, after which I was asked to enrol on a 24 meter sailing yacht as a crew member (I had to cook for all the people on board, helping with the cleaning of the boat and helping on the deck as second officer) Then once I came back, I worked as a naval architect on the Technical Department for the other two weeks. Two years later asked me to join them to work as Project Manager, to help with the planning of all their projects. During this period, I had the chance to collaborate with the Spanish America’s Cup Team.

When I arrived in Italy I decided to work while I was studying to get more expertise, so I joined YS&T, a new naval architect consultancy office.

Once I finished my Masters degree, in 2008, I joined Lloyd’s Register for a six months training period, after which, I started working with a fixed term contract at the Trieste Technical Support Office in the Hull Section. There I dealt with structural and load line aspects for yachts and mega yachts under the Special Service Class Rules and relevant Flag requirements.

On 2010, to celebrate the 250 years of Lloyd’s Register, with some of my colleagues I helped to organize a charity sailing race, Sailing for Children, to raise funds for three NGOs in Trieste, with a local yacht club, the Società Tiresina della Vela. The race was also to enable disabled children to participate in a real sailing race. It was such success that today is still on the local sailing race calendar.

On 2017, I wrote and presented a technical paper about “Floodable docking garages on yachts” on the fifth edition of the “Design & Construction of Super & Mega Yachts” conference, organized by the Royal Institution of Naval Architects in Genoa. This paper was published in the Ship & Boat International magazine.

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After years of hard work and dedication, I became a Senior Specialist and am a point of contact for the Italian yacht industry for issues related to structural and load line aspects, for providing technical assistance and for delivering training to the stakeholders and colleagues.

Cristina Barba Fau



Women in the Institution: 2019

Daniel Doggette MRINA

They say the white squalls of the Great Lakes rise up faster than anywhere else in the world, a danger to those who sail upon their fresh waters. This is where I began sailing, on-board the sail training brigantine *St. Lawrence II*, at age 13. My first time on a sailing vessel of any kind, the first so-called ‘cruise’ was eight days. Since then my life has been dedicated to the sea, obtaining my masters licence at age 21, followed by graduating from the Enkhuizen Zeevaart School KZV, when it was all still in Dutch.

After the company I founded, Topsail Rigging Ltd., completed the rigging of the new cargo schooner *Ruth*, it was an honour to be her captain for her launch; largest vessel built in the history of Barbados. As it was an unprecedented launch method it was clear that this was a risky manoeuvre. No one seemed to mind very much that I was a young woman who had never yet been a captain. This rigging company later took me as far north as Greenland as part of the Opal project that saw the world’s largest electric engine installed that had the capability to regenerate power from the propeller. Topsail Rigging Ltd. also allowed me to be the first woman ever to sign on as crew on an Omani Naval ship, during the sea trials of *Shabab Oman II*.

Sailing on traditional square or gaff-rigged ships, seamanship has always been my priority. The first wreck I had any connection to was the loss of *Asgard II*, just weeks after I first saw her and meet the crew. Something about the loss of a ship weighs heavily on me; it is something I vow to never to forget. I am thankful that my friends on-board the ill-fated *Concordia*, the *Bounty*, and *Astrid* all lived to tell their tales. Perhaps it was my start on the cold, rough waters of the Lakes that keeps the reality of the peril close in my mind.

Three years ago, at age 26, I embarked on a new voyage: leading the build of sailing cargo ship CEIBA, the largest new wooden ship build in the world at this time. When I look forward to when Ceiba will sail, I know that she, too, will face storms and what many mariners simply refer to as ‘weather’; that her crew will have these challenges to overcome, many of whom will be women. I am thankful to bear the weight of upholding the highest levels of construction, seamanship and training, so that these future mariners can have positive experiences, as I have. There are constant dangers, some of which we can do nothing to avoid... but there will always be a need to go to sea. Even if what they say is true, and soon no human will be required to handle the freight ships that move 90% of all goods in the world, people will always be drawn to distance, over oceans.

In the spirit of remembrance and with the weight of responsibility, I’ll quote Canadian maritime singer Stan Rogers ‘Let her name not be lost to the knowledge of men (and women).’ I am driven to remembering the instances where ships were lost, people were lost, but memories were not. The future for women at sea is bright, and I look forward to welcoming many new seafarers on-board Ceiba, with all the dangers and unparalleled beauty that lies ahead.

Danielle Doggett



Women in the Institution: 2019

Fiona Parker AssocRINA

After deciding not to apply for a career as a linguist with the Royal Navy I went to university, then zigzagged my way through a career which included teaching English as a foreign language in Paris, exporting oil and gas pipeline equipment to the Middle East and managing the worldwide marketing of technical goods and services for UK and foreign companies. Until the phone rang one day and an ex-colleague asked, “Can you write a manual we can leave with our customers after we finish training them?” I accepted the challenge and discovered a profession called technical communication which has given me immense job satisfaction and eventually led me back to the sea and to things naval. I became a freelance technical communicator, specialising in producing proposals, technical documentation and training materials for maritime engineering companies. I have been working in the maritime sector for the past seven years.

Since that phone call I have had many different job titles and written for a law firm, a geophysical services company, military training organisations, an aircraft equipment manufacturer, a financial technology provider, maritime research teams and maritime equipment designers, suppliers and support service providers. Today I work mostly with teams of senior maritime engineers and project managers. I am usually the only professional writer on the projects I work on and frequently the only woman. My clients’ teams work at the cutting edge of technology, designing and developing equipment to deliver improved performance and better value for money than existing options. The work environment is highly professional, very collaborative and genuinely customer focused. Every project presents a new learning experience as I work closely with the engineers to understand what we need to communicate to their customers and how we can do that in an interesting and engaging way.

Over the past five years there has been a noticeable increase in the percentage of women joining the companies I work with, both through graduate schemes and general job recruitment, so the opportunities are there. My clients generally undertake light engineering projects (providing equipment for ships as opposed to designing or building ships) and the number of senior positions held by women is increasing gradually.

There are shortages of engineers in some specialist high tech areas which offer good opportunities for individuals prepared to spend five to ten years gaining expertise in them. Although there are fewer alternative job options, engineers with such rare expertise are often granted plenty of autonomy and can command a good salary owing to their scarce supply.

If you are a woman attracted by the idea of a career in the maritime sector my advice would be:

- Define the area you feel drawn to work in as clearly as you can - by job description, subsector, location and other characteristics important to you.
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- Draw up a list of companies that offer suitable opportunities and assess your potential work environment using all the resources you can – the internet, press releases in technical magazines, contacts on the inside, and so on.
- Don't be put off because a potential employer does not currently employ many women but think about whether you are happy to be a pioneer to pursue a good opportunity or whether you would prefer to work in a more gender balanced organisation.
- Be prepared to relocate for the right opportunity.

I would definitely recommend the maritime sector to women. If you are prepared to work hard, deliver good quality output and maintain a professional attitude to your colleagues and the job you should do well. Interesting and unusual opportunities await you!

Fiona Parker



Women in the Institution: 2019

Gabriela Grasu MRINA

I graduated from the Polytechnic Institute of Bucharest, Faculty of Mechanics in 1991 gaining a BEng (Hons) degree in Mechanical Engineering. In this year I also started my career working in a Romanian Shipbuilding and Technological Equipment Enterprise as a Post Graduate Trainee. My first position was as a Production Dispatcher within the Mechanical Workshop which was a quite different direction from my teenage dream: an engineer harnessing the power of a Hydroelectric Power Plant.

Since I was a child I was fascinated by my grandfather's carpentry work and I was given the important task of straightening the bent nails to keep me occupied but he never discouraged me or told me to go away and play with dolls. Growing up on the Danube maritime canal banks I was always surrounded by all kind of ships and the legends of the European Commission of the Lower Danube. Perhaps the seeds for a career in marine engineering had always been there waiting for the right moment.

Since 1991, I have built up a continuous experience as a mechanical and outfitting design engineer navigating different working practices, requirements, and challenges of the Romanian, Norwegian, and British shipbuilding and offshore industries. By 2007 I was a Steel Outfitting Coordinator, leading a team of around four engineers for the offshore supply vessels detail design, when I decided to live and work in the UK. It was one of the biggest challenges of my professional and personal life but I worked hard and with my colleagues and employer Babcock's support, I became a corporate member of RINA and gained Chartered Status in 2017. My passion for marine engineering goes beyond working hours and since 2008 I have attended regularly the lectures held by the NECJB at Newcastle University and South Shields College, being co-opted as a committee member in 2016 and nominated as a chairman in 2018. My aspirations to continue my development have not stopped there, in that same year I enrolled for an MSc in Marine Offshore Renewable Energy with MTEC to add my little contribution towards one of the biggest challenges of today's society: global warming.

I genuinely believe that a woman can be as good as a man in naval architecture and marine engineering and we already have great examples. The future is brighter as society's acceptance and the support is increasing day after day but this career is not something that should be persuaded upon just because of that; this profession requires passion, hard work and dedication perhaps more than any other because there are still some traditional barriers to overcome.

I will always say for a woman or girl to go for the profession which is in her mind, heart and natural skills. A career is not for a season, it is for a lifetime, so you need to enjoy it!

Gabriela Grasu



Women in the Institution: 2019

Gillian Gray MRINA

When I started out, as one of two female naval architecture undergraduates in my class of thirty-five, it was a standard joke that we would be painting all the boats pink. Twenty plus years later I am contemplating marketing my designs with paintwork in, you guessed it, pink. This is because I see my minority gender as a benefit not a hindrance. I have had at least one client specifically choose me for his project because I am female. His logic was that I must be good to have stuck at it despite the perceived difficulties. Also, being a woman in this industry has meant that people almost always remember who I am, which can be an advantage or a disadvantage if I have no recollection of meeting them!

In general, I believe that the opportunities that I have had have been equal to that of any man. I have spent much of my career working in shipyards designing and building boats in the UK and abroad and the complex technical challenges have been far more significant than any challenges associated with gender. Where my career diverged from the 'typical' trajectory was in the choices that I made when it came to motherhood. Had I been employed in a large company, like some of my female naval architect friends, I could have benefitted from flexible working patterns. However, as I chose to live away from the major hubs I decided to start my own business while my children were still very young. I have now been working independently for nigh on ten years in my own naval architectural design consultancy, which allows me to balance my work and family life.

I have found that naval architecture has been a great career to work in on a freelance basis, particularly in the small craft sector where many consultancies are run as micro-businesses. However, I was actually very fortunate to discover it as a career. Despite being around boats all through my childhood and knowing from a young age that I wanted to design, it hadn't occurred to me that wherever there was a product that meant somebody had the job to design it. I was lucky enough to visit Strathclyde University while I was making my career choices and saw the work of Naval Architects and I have never looked back.

In my experience, there has been a constant improvement in the way that heavy industry deals with women in the workplace. For instance, I can now get PPE that fits me, and I can't remember the last time I had to turn a blind eye to a provocative calendar. Remote working and flexible working are going to open up more opportunities for attracting and retaining talented engineers in the maritime sector – male and female.

Gillian Gray



Women in the Institution: 2019

Hannah Joyce AMRINA

I was once asked “what makes women go into engineering?” and my reply was “the same things that make men go into engineering!”. I don’t think this was quite the answer that was expected, although it seemed obvious to me! Jobs that require problem solving, creative thinking skills and technical knowledge and understanding are just as attractive to women as they are to men.

My career as an engineer in the maritime sector started relatively recently, so I don’t really remember a time when being a female engineer was particularly rare. Both in my time studying Marine Engineering in Newcastle and now working for Lloyd’s Register, I have seldom faced any gender discrimination or barriers. I am pleased to say that, despite some antiquated shipyard workers that I have met, my colleagues, clients and contractors I work with don’t treat me any differently because I am a women. I am also pleased that nobody is surprised to see a female engineer.

However, there are indeed some improvements which can be made within the maritime industry: I spent some time working in a shipyard where the only female toilets in the whole yard were next to the admin office!

Having female role models to look up to has been really important to me. Specifically, I recall a female senior lecturer I had at university who was very successful and knowledgeable in her field, being involved in various research projects and other senior activity within the faculty. For me this was a turning point; I forgot any doubts I had about being a female marine engineer, and grew in confidence knowing that there would be no limits to my career.

For future generations of engineers in all sectors to be successful, I believe it is important to encourage STEM subjects early on for girls; not because they are female and ‘we should have more female engineers’, but because they are good at what they do and they have a valuable part to play. There are still a few outdated opinions out there, so girls sometimes need a step-up into engineering, but once we are there... there is no stopping us!

Hannah Joyce



Women in the Institution: 2019

Holly Phillips MRINA

Since a very young age, I always had a passion for the sea and anything that floated on it. I also spent much of my childhood in and around boats and when I was old enough, worked on a passenger boat in Dorset. To be able to enjoy a career involving boats and to get paid for doing something I enjoyed was a no-brainer! Having studied maths, further maths, physics and chemistry at a level, I embarked on an undergraduate degree in Ship Science at the University of Southampton. I continued with my academic studies and having completed my PhD on the subject of damage tolerance of composite structures, set foot into the commercial world designing ships' high lift rudders.

In 1992, I joined the Poole Lifeboat crew that not only gave me an increased passion for the sea but also for the RNLI who I had always hoped to work for one day. Coincidentally, I was the first woman to join the crew in Poole and the RNLI's 100th female crew member. I was keen to just get on with the training, but the publicity did give me the opportunity to encourage girls to get involved in boats and engineering when perhaps they may not have thought of doing so. After 5 years of designing rudders, an opportunity arose, and I joined the RNLI as a Senior Naval Architect in 2002. A few years later, I was promoted to Principal Naval Architect, a role I have been enjoying ever since. As part of the RNLI's engineering team, I and my team are responsible for the structural and stability aspects of the RNLI's fleet of all-weather and inshore lifeboats and other equipment. I was also lucky enough to be offered the opportunity to manage the project to design and oversee the manufacture of the E-Class Mk2 lifeboats for the River Thames. This had a personal element for me having grown up close to one of the RNLI stations and rowed on the Thames whilst I was at school. It almost felt like I was going full circle!

I am extremely fortunate to be part of such an extensive network of maritime professionals, whether it be through my work career to date, membership of industrial committees or ad hoc workshops and conferences. It is great to be part of a thriving maritime industry both in and out of work and I'd encourage everyone to get involved. Specifically, there are many new, emerging technologies and is even more overlapping across industry sectors than ever before so there are great opportunities to transfer skills and technologies into the maritime industry. The STEM activities have increased significantly since I was at school and I am hopeful that these will continue to entice young people into science and technology.

Engineering really is a fantastic career choice for all – in my experience, every day brings different challenges and you never quite know what's around the corner!!

Holly Phillips



Women in the Institution: 2019

Jane Jenkins FRINA

I went to London in the 1970s to find a job. Not as many people went to university then and there was plenty of work. The advertisement for a Technical Assistant in the Statutory Departments at Lloyd's Register of Shipping London caught my eye, probably in rebellion against the school careers advisor who said that teaching rather than engineering was more appropriate for a girl.

After a 5 year apprenticeship, I was working in an office on statutory plan approval for all marine and offshore vessels. Sometimes visiting passenger ships and offshore units as a specialist on inclining experiments.

In 1995 I accepted a posting to Busan, Korea. Before leaving I recall being called to the Chief Ship Surveyor's office to be told that as a single woman he did not know why the company was sending me there. I can see the hesitation. This had not been done before but technically I was the best person for the job. As well as an amazing experience, I am proud of my success in Korea. I like to think that my presence helped to promote acceptance of women engineers in Korean offices.

In 1999 I took a break from Lloyd's Register. The criterion for maintaining technical qualifications was increasing. I decided to go to University and was accepted by Cranfield on an MSc course in Computational & Software Techniques for Computer Aided Engineering, which provided a useful insight into the aircraft and automotive industries.

In 2002 Lloyd's Register and I joined up once more. Since then I have been involved in amazing work including participation at IMO in the development of the probabilistic method for assessing ship survivability. Currently I support governance over a wide variety of specialised issues related to passenger ship services. This has provided an opportunity to work with the Interferry Domestic Ferry Committee, lobbying for the improvement in safety of domestic ferry services. Together with the LR Foundation support we are now seeing tangible worldwide interest in defining pragmatic solutions that will save lives at sea.

The future? There are so many interesting things for Naval Architects to get to grips with. Why should ships look like they do today? Sustainability, the environment and all the buzz words such as block chain, autonomy, AI etc provides a basket of items to contend with. No other transportation industry offers the variety of vessel types as marine and offshore. Log tables and a slide rules which I learnt to use were relegated to the Science Museum long ago. Many of today's items will soon join them!

Would I recommend Naval Architecture? Of course. It provides a unique career with a pathway to opportunities ranging from academia and design to business and marketing. Advanced communications provide flexibility to tailor work and home life. Women remain in the minority of many of the meetings I attend but it is a culture of equal opportunities that counts, not the numbers. Much has changed in engineering during my lifetime and I cannot complain!

Jane Jenkins



Women in the Institution: 2019

Jane Westmore FRINA

When I told my careers teacher that maths and art were my favourite subjects, she suggested naval architecture. I read up about tests on planks in rivers and was captivated immediately.

After school, I joined the 4-year apprentice programme at VSEL in Barrow-in-Furness as a ship's draughtsman. After gaining an ONC and HNC in Shipbuilding and Naval Architecture at Barrow-in-Furness College of Further Education, I decided to go to Southampton University as their BSc covered small craft theory as well as general naval architecture. The ONC and HNC were the basis of the skill developed during my career.

At my first interviews after graduations in 1977, it seemed employers were still reluctant to take on women, so to add to my CV, I embarked on an MSc in Shipbuilding and Naval Architecture at Strathclyde University, to add credence about my knowledge of shipyards and general naval architecture practices.

For my final dissertation, I studied what caused change and the effects. I interviewed people in several shipyards, but none owned up to any change! Strange as my drawing office experience was that plenty of change occurred! I changed tack to looking at introducing CAD/CAM but I had little interest in the subject and struggled to find much useful reference or experience with it.

After my MSc I joined Scott Lithgow, where I worked mainly on structures, barge load out and inclining experiments, monitored the weather station output and learnt to use spreadsheets and framework programmes.

After Scott Lithgow, I joined YSL to work in the Ship Design Office. Initially I worked on local structures, masts, shaft brackets, flight deck. At this time, I achieved Chartered Membership of the Institution and was promoted to Senior Design Engineer, where I oversaw a team designing equipment seats, from RO plants to small panels, to MOD requirements. During this time I also gained an Open University degree in Maths and Technology.

After YSL I joined Clark & Standfield Ltd. Support from colleagues at Scott Lithgow helped to overcome some doubt which still existed about employing a woman. Most of the work was on stools for submarines on synchrolifts, but I also learnt the basics of floating docks, dock gates and similar structures that have their own twist on stability calculations.

After marriage and motherhood, I re-joined YSL where I was the first person taken on a part time basis after having a baby, which helped later applicants. Back at YSL, now BAE Systems. I have worked in Production Design, Forward Design, various ship projects. Some work on tidal power generation did not come to anything. I again look after equipment seats and local structure, checking, approving, monitoring and providing guidance to a team of engineers. I put the red pen on work, rather than receive it on mine!

Generally, I have enjoyed my career, met great people and enjoyed wonderful opportunities. Thank you, naval architecture! (I even got to some tank tests, but never saw any planks being towed though.)

Jane Westmore



Women in the Institution: 2019

Jennifer Knox FRINA

Growing up 250 kilometres inland from the Queensland coast, I never knew there was such a person as a naval architect. After training as a tax accountant, I soon began to think there must be more to life than poring over balance sheets. I joined a charter yacht company and spent several years sailing in South East Asia and the Indian Ocean. Sitting on those yachts in various ports I contemplated the large commercial vessels discharging and loading their cargoes and mused on the complexity of systems that must support those activities. “Have no regrets when looking back in life” was some good advice from an engineer I consulted and so I returned to university studying Naval Architecture, and graduated with honours from UNSW.

First employed by ADI at Garden Island Sydney in 1991, I worked there for five years first starting in ship survey and then moving to the design department. The first months at the dockyard were sometimes challenging with some of the old hands somewhat aghast that a woman should be “taking a man’s job” and “how would she ever cope with climbing into a tank to inspect the ship structure? She might get dirty!” Fortunately, every negative opinion on the suitability of employing a female for this role was balanced both by support from the General Manager of the Engineering Department, Malcolm Burridge and the enthusiastic comradeship of other employees who were willing to share their experience. As project engineer for the refit of Oberon Class Submarine *HMAS Onslow*, I was responsible for all structural surveys on the boat including circularity survey. At conclusion of that refit I participated in the submerged inclining, receiving special authorisation as the first female to be so included. In the design department I was project manager on several research projects involving hydrodynamics of lifting surfaces and high-speed ship performance and then manager of the division’s research and development program

An opportunity arose in the design department to take a placement at the Danish ship design consultancy Knud E Hansen in Copenhagen. This developed into a two-year employment contract. While there, I worked on concept designs of passenger vessels; hydrodynamics including performance optimisation and ship motion studies; and stability analyses of large Ro-Ro passenger ferries.

Returning to Australia in December 1997 I co-founded the naval architecture and marine design consultancy Lightning Naval Architecture (LNA). Finding a niche in the commercial maritime industry and some wonderful clients LNA is now celebrating 21 successful years of operation. At LNA I work on the technical analysis of passenger, special purpose and dry cargo vessels by creating sometimes complex 3-D computer models of these vessels to analyse their behaviour at sea. The analyses regularly cover the areas of intact and damage stability including optimisation of watertight sub-division.

I now have considerable experience in carrying out probabilistic damage stability calculations. Speed and power performance prediction including propeller optimisation are other tasks, as well as manoeuvring calculations and sea trials and sea-keeping analyses. I regularly carry out stability survey and testing on both IMO-regulated and Australian domestic commercial vessels. To broaden my ship stability credentials I recently became an accredited Australian Maritime Safety Authority surveyor and particularly work in the area of vessel stability. I also work on design for conversion of passenger and special purpose vessels.

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I am the author of the chapter on Ferry Design in the 2005 edition of *Ship Design & Construction* for the Society of Naval Architects and Marine Engineers and quite regularly speak at industry conferences. In 2015 I was elected as Fellow of the Royal Institution of Naval Architects, the highest class of membership an honour which I value highly.

Jennifer Knox



Women in the Institution: 2019

Kimberley Hawkes

I chose to study naval architecture as it combined a number of my interests. As a teenager I volunteered with a search and rescue group, based on the Solent, which sparked my interest in boats. My dad is a gas engineer and encouraged me to think about engineering apprenticeship programmes, however when I found out about the Ship Science degree offered at Southampton University, I decided that that was what I wanted to do.

Before University I decided to take a 'year in industry' at BVT Shipbuilding (now BAE Systems) in Portsmouth, working in the design office and in production engineering. I then went back each summer and worked in a different area each time, from support engineering to concept design. After University I worked at QinetiQ at Haslar, running hydrodynamic experiments, and I now work for Carnival Corporation, in the new builds department. I feel very lucky to have had such a range of different experiences over my career so far, from sea trials and inclining experiments, to concept design, to research and data analysis.

I would recommend naval architecture as a career for women (and men) as it is an interesting and challenging job with a huge variety of different paths and opportunities. I really enjoy how it combines logic and problem solving with design and creativity, not to mention organising, planning and management. I feel a huge sense of achievement whenever I see a finished project to know that I have had a part in making it happen.

I think it is becoming less unusual for women to be working in this industry, and I hope that is something that continues into the future, especially with STEM events promoting engineering as a career to both girls and boys. I would advise any women thinking of taking up engineering to follow where their interest takes them, as it really is a fantastic and rewarding career.

Kimberley Hawkes



Women in the Institution: 2019

Kirsi Tikka FRINA

I grew up in Finland in a town with several shipyards, but I had no plans of becoming a naval architect. I ended up studying mechanical engineering mainly because I was pretty good at math and physics. My summer internships were in the shipyard, first doing physical labour and then in the engineering office, and I found myself enjoying the work and the shipyard environment. I added naval architecture focus in my studies and I was introduced to a profession that has been a big part of my life ever since.

My career has taken me from a shipyard in Finland to a graduate school in Berkeley, then to Chevron Shipping in San Francisco, followed by Webb Institute in New York. From Webb I moved to American Bureau of Shipping and have been based both in Europe and the US. Each of these experiences has taught me valuable lessons about the maritime industry that extend beyond shipping and into everyday life.

Work at the shipyard taught me about designing and building ships. I also learned to appreciate the pride the shipyard workers at all levels had in the final product, the ship.

Graduate studies at UC Berkeley taught me how to think in ways that allowed me to formulate and approach problems from new directions. Berkeley gave me a curiosity of things undiscovered and the respect for people coming from all over the world, studying different disciplines.

My time at Chevron was a crash course in shipping from new construction and maintenance to operations and commercial aspects. I had the opportunity to get to know the crews sailing the fleet and to spend time at shipyards in Asia, Europe and the US.

As a professor at Webb I got to know the students I taught and advised on their thesis work. At Webb I also learned that each class has its own dynamics and personality. I have carried that knowledge with me to the industry when working with teams which also have different dynamics and personalities.

At ABS the mission of the organization is to protect the safety of life, property, and the environment. I held a number of positions and travelled around the world multiple times. The world has become smaller with technology and now more than ever it is important to understand and respect the differences.

I am now in a new stage of my career as independent non-executive director, and I hope to continue to make a positive contribution to the industry that is responsible for the transportation of 90% of the world trade. The fast pace of technology development is changing the world. There are challenges and opportunities, such as the elimination of greenhouse gas emissions from shipping, and the development of autonomous ships of the future.

There is more to life than work and the maritime industry does not always make it easy to balance work and family life. When I started as a young naval architect there were very few women working in shipping, and even less in technical roles, or traveling on business and working in the shipyards around the world. I cannot say that it was always easy, but the positives outweighed the negatives during those years. During my children's early years I was professor at Webb and the environment was supportive. My time at ABS included a lot of travel but by then I was no longer the lone woman in the industry. Having a technical

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background helped to get recognized because, after the initial clarification that I was not a secretary, it allowed me to demonstrate the knowledge required to get the job done.

Today women are in many leading roles, both technical and commercial, but the overall percentage of women in shipping is still small. We still have a lot of work to do to make the industry attractive, and make opportunities available to women around the world. Women need more role models to show that shipping and technical roles can be a natural and rewarding career choice.

Kirsi Tikka



Women in the Institution: 2019

Kirsten Henderson MRINA

Having come from a long line of merchant seamen and fisherman, the world of shipping and ship-building always held a fascination for me. Studying Naval Architecture at the Universities of Glasgow and Strathclyde was a natural choice, graduating in the summer of 2011

During my time as a student I had summer placements with Badcock Rosyth and Lloyd's Register in their London office. I was also given the opportunity to travel to Habin Engineering University in China, to act as a student ambassador to help ease the transition of students from China to Scotland

Upon graduation I joined the Lloyd's Register Graduate Training Scheme. This opened a world of opportunities to learn, experience first-hand the operation and construction of vessels and extract as much knowledge from my experienced colleagues as I possibly could. I spent the last two years of my training working in Singapore, as both an in-service and ship repair surveyor. Every day was a new challenge, and I really enjoyed meeting and working alongside the shipyards, crews and superintendents. The variety of workload ensured there was never a dull day, and there was always an opportunity to learn something new.

In 2015 I moved to South Korea, into the new construction shipyards of Geoje Island. The scale and efficiency of the shipyards was quite overwhelming at first, however I quickly found my stride. There is always something fascinating happening in the yards. I loved the ability to follow the steel plate from the stockyard all the way into a finished vessel. My projects have been diverse, ranging from navel vessels to the construction of an FLNG.

During a spell with Teekay Shipping, I was working as a Cargo Containment Superintendent for the construction of LNG membrane tanks. This presented me with a huge learning curve, and massive satisfaction in seeing the completed tanks being closed and ready to take their first LNG cargos.

Working in the construction shipyards of Korea has been an invaluable experience, allowing me to build life long friendships with the people I worked alongside.

I have recently moved back to London to take on the role of Executive Assistant to the CEO of Lloyds' Register. This role promises huge opportunities to experience the running of a multi-national company, one that is so important to the marine industry

I would recommend a career in the maritime sector to any woman. The work is diverse and always interesting. However a highlight for me has been the people I have met and worked alongside, and the passion shared by every person working in the industry.

Kirsten Henderson



Women in the Institution: 2019

Liria Peña Gomez MRINA

I always had an interest in the sciences, and I guess that the fact that I was born at less than a mile from the sea and have always lived near by the coast had an impact on what I wanted to dedicate my life to. After much thought, I decided to become a Naval Architect and yes, I got so many weird faces because, let's be honest, not many people know what we do. Nevertheless, here I am many years later with a career I would have never been able to envisage at that time. I have gained freedom, self-confidence and financial independence but those are just some examples. The benefits of having a professional career are endless. I'm currently taking a career break but still engage with the maritime sector. I can't part with it, it has got a very special place in my life.

The maritime sector has brought me something which we Naval Architects love so much, and that is good stability in both my personal life and professional career. I have had great opportunities to gain experience in different aspects of the maritime domain. I have worked in design, shipbuilding, in-service support and even on disposals. I have been able to travel the world and make very good friends.

Years of experience working with customers from all around the world have widened my perspective about the maritime sector and the role I play in it. I can now understand how my role is key to achieving organisation and government goals. That has given me reassurance that I chose the right career for me.

Many people in the world, especially women and girls, face multiple barriers based on gender and are taken away from education to take on roles historically considered appropriate and more suitable for women. That type of behaviour should not still be happening in the 21st Century. My parents taught me not to take the opportunity I had of going to College for granted. It was food for thought for quite a long time. I wasn't sure myself if it would be okay for a small girl like me to work in such an environment, but finally, I decided to show up for those who didn't and still don't have the opportunity to have a career, especially in a male dominated environment.

It's clear that there is a gender gap in this sector. At many a meeting I'm usually greeted with "Lady and gentlemen". Hopefully, this will stop happening in a near future. The maritime sector keeps growing year after year, and I can see more women embracing the adventure and not feeling afraid to take the risk to start a career they feel passionate about, even if it is not one as popular as others within their friends and acquaintances. When asked if I would recommend this career to other women and girls, I can't say anything else but a big "yes of course, go for it".

Liria Peña Gomez



Women in the Institution: 2019

Luh Putri Adnyani AMRINA

As a woman working in the Indonesian maritime sector, I have been involved in many projects dominated by men. I received both my Bachelor and Master degree in Sepuluh Nopember Institute of Technology. I have worked as a teacher, researcher, and also project assistant in the maritime field during university, before I accepted the offer to teach. In 2015, I started working as a lecturer in the Naval Architecture and Shipping Department in Kalimantan Institute of Technology. And in 2018 with the opening of the Ocean Engineering Department, I was appointed as a Head of Department.

Being a lecturer is my childhood dream, which is why I agreed to move from the bustling Java Island to the more remote island of Kalimantan. I wanted to see the future I might have in Balikpapan and to help the youth in Kalimantan receive quality education and be ready to work and be of service to the community after graduating, as well as changing our region and Indonesia to be a better place. ITK (Kalimantan Institute of Technology) was a new public campus. Our first student in Naval Architecture Department started their study in 2012 and we are still going strong until now in 2019.

The total number of female students in the Naval Architecture Department in ITK has gradually increased from 2012 to 2018, even though the number of female students are always less than male students. As a lecturer, I always encourage female students to compete and be confident with their male counterparts. For example, in the welding practice, most of the female students have more presentable and cleaner weld result because they are more patient and diligent. While in class, they also give more attention for lecturers and taking some notes. In class, I always try to encourage my female students by showing them some examples of successful female engineers.

It is a fact that Indonesia has many vacancies and jobs related to maritime sector because Indonesia currently has aspirations as the Indonesian Maritime Axis, so that the shipping, naval and ocean sector needs special attention and advancement. I was involved in many such projects, like Procurement of Marine CNG Experts for Marine CNG Review Design and Construction Supervision, Manufacture Work Agreement for Front End Engineering and Design (Feed) Deployment of Submarine Gas Pipes with Diameter 14 "for 21 Km in Waters of Pasuruan, East Java. The experience when working in that project made me aware of the lack of interest women have in this sector.

With gender equality, the chances of women working in the maritime sector are very high. There are still many job opportunities, especially in Indonesia, which require female staffs in engineering. Therefore, in the future, women need to be brave and we should encourage them to study and work in this field where men still dominate.

Luh Putri Adnyani



Women in the Institution: 2019

Margot Codard AMRINA

My passion for sailing and my keen interest in sciences were and still are the main driving forces for pursuing a degree and a career in the marine industry. In addition to that, while at school in France, I had the opportunity to meet a Naval Architect as part of a high school project related to the use of mathematics in sailing. This acquaintance was significant since it revealed to me how science and engineering thinking can be applied in sailing and years after our first meeting, I actually had the pleasure of having an internship with him (Vincent Lebailly Yacht Design).

When the time came to choose what to study, I remained faithful to my interests and dreams to become a Naval Architect, despite knowing that the engineering sector in general, and the marine industry in particular, is male dominant. Staying true to my goals, working consistently and with persistence I managed to complete my BEng in Naval Architecture with High Performance Marine Vehicles with First Class Honours at the University of Strathclyde in 2017 and then receive an MSc in Maritime Engineering Science with Yacht and Small Craft with First Class Honours at the University of Southampton in 2018. Having developed a particular interest in fluids during my studies, I channelled my BEng and MSc individual research projects towards the numerical study of sail aerodynamics and the impact of membrane deformation on wing sail performance respectively. In both cases, CFD was performed.

Less than a year ago, I started my Ph.D. in the department of Naval Architecture, Ocean and Marine Engineering at the University of Strathclyde in Glasgow, Scotland. My research is focused on the ventilation and other complex flow phenomena associated with flapped T-foils (i.e. Moth hydrofoils) and it involves both model experiments and Computational Fluid Dynamics (CFD) analysis.

During my academic studies in both universities, the class was composed almost entirely by male students. However this was never a cause of injustice towards myself since, in my experience, women and men alike were both being objectively judged based on meritocratic criteria. Throughout this years, my academic achievements and personal work have been appreciated and recognised by the award of various prizes, scholarships, etc

I would, therefore, highly recommend to any girl or woman who wants to get involved in the marine sector to do so since it is an industry with tremendous opportunities for everybody regardless of their sex. I would love to see more females pursuing their passion for the marine field and I do hope and believe that in the future there will be more girls and women choosing to a career in STEM subjects.

Margot Codard



Women in the Institution: 2019

Maria Gabarini AMRINA

If I had received an invitation to speak about women and shipping at the beginning of my career, I probably would have thought that the invitation itself was a sort of discrimination...but after more than ten years in this field, I know what it is to be a woman in the maritime sector and I am pleased to share my experience.

When I chose naval architecture and marine engineering, actually I wasn't yet exactly crazy for "ships" as such, but I was mainly interested in the wide range of engineering disciplines you need to know to design and operate them. There were very few enrolled women compared to other engineering courses. Unlike me, most of my classmates were from naval architect families, and people around me warned me that I was undertaking a career that was too male-dominated.

Even if all the above was the right mix to give up, I went on my way. I started liking naval architecture more and more and I was lucky enough to have a great traineeship in a shipping company during my studies. Finally, I was hired by the same company the day after my graduation. At the beginning I felt a bit different. The crew on-that board welcomed me with "the female engineer is coming", or someone always emphasised I was a nice engineer rather than a fine naval architect. As soon as I gained experience abroad, this feeling disappeared.

Sometimes, unbelievably, some recruiters are still convinced that woman means too long maternity leave and family matters; while I was pregnant I was in the model basin and I checked hull blocks in South Korea.

I have had the good fortune to follow different shipbuilding projects from the very first line of the body plan, taking care of the design to the construction and engineering matters during the ship's life-cycle, working together with a good naval architect and teacher. Every time I see one of my "ships" from the window of my house, I'm proud to go through each step with my family because it is a part of my life.

I now work for the Classification Society Registro Italiano Navale with many women, and where there is no longer any discrimination, just the added value of different points of view. Many women have executive positions in the maritime sector and more officers on board are women.

I'd like to recommend to all the girls interested in this field to come forward, to attend graduate school seriously, taking advantages of the international programs every campus offers. There are also many interesting conferences about new technologies and trends; it would be a shame to lose the opportunity to be in the loop, even if still a student, and to understand their own way. The naval architecture history is full of women achieving a great deal, as the Institution is commemorating, and I believe it is only going to get better and better and better.

Maria Gabarini



Women in the Institution: 2019

Maria Argyrios Mothoniou AMRINA

I graduated from the Technological Institute of Athens in 2016, from which I received a BEng diploma with the qualification of Naval Architect and Marine Engineer, specializing in marine engineering in 2016. I worked in a consultancy office as Junior Naval Architect for 3 years and since 2017 I have been working in a large Greek shipping management company as a Technical Managers' assistant. Simultaneously, I am studying in Frederick University, International Trade & Shipping Management.

I chose the shipping industry for my future profession because it is possibly the oldest form of the Greeks occupation and has been a key element of Greek economic activity. Furthermore, I come from a Greek island, so I am in love with sea. For me, it is very important working in shipping industry, having many professional resources to follow either in marine engineer sector or in shipping management.

I consider it is my obligation to continuously develop my professional and personal skills. The fact that I enjoy this process proves that I made the best professional choice I could. I enjoy and cherish my association and cooperation with meritorious people working in the same sector. Having all that, I strive to enrich my efforts in reaching my future goals.

In the next 10 years I will do my best to achieve a managerial position, or else I will try to establish my own business in shipping industry. I assume that with hard work and the will, these goals shall come true. Generally speaking, I believe that women are inclined to organisational skills and methodical thinking. Taking the knowledge as fact, if a woman possesses coordination, negotiation and leadership skills, certainly she has the possibility to gain a managerial position.

If I have the opportunity to discuss with women who are now starting their professional careers I would definitely encourage them to choose the shipping industry. In our country, apart from tourism, it is a sector that still has a lot of demand as well as it is also competitive on the labour market.

Maria Argyrios Mothoniou



Women in the Institution: 2019

Marion James AMRINA

I was lucky to start sailing at the age of five on my family boat. I knew from an early age that I wanted to work in the maritime sector. First, I dreamed of becoming an oceanologist, but as my interest in Mathematics and Physics developed, I found my passion: to design racing yachts. Hence, I decided to leave France, my native country, to study Ship Science at the University of Southampton. This course opened my eyes on a much bigger maritime world than I expected. I was keen to discover the maritime world so I organised several internships and attended numerous conferences. The Institution offered me several sponsored conference places, allowing me to develop my knowledge and grow my network.

Being awarded a BMT Student Bursary, I did two summer placements in England. Thanks to the Royal Academy of Engineering and their Engineering Leadership Advanced Award, I was given the opportunity to study for a semester at Webb Institute (US), undertake three internships in Asia and visit many shipyards worldwide. My aim was to better understand ship production, and to ultimately to design efficient ships.

During my Masters, I focused on hydrodynamics with the aim of reducing the environmental impact of ships through the use of retro-fit devices. I then applied the skills learnt to the hydrodynamics of a swimmer and researched novel ways to be the most efficient through the water. My PhD work, supported by the English Institute of Sport, British Swimming and Speedo, contributed to the success of the UK at the 2016 Olympic Games in Rio.

During my PhD, besides working as a teaching assistant, I developed the Southampton Hydro Team, with the prime aim of enhancing student education through the design and build of a 2.5m remote-control foiling boat. I also gave talks to girl schools and helped out with the Smallpeice Trust event to inspire the younger generation to study Ship Science.

Following my PhD, I moved to Paris and joined Avencore, a management consultancy firm specialised in industrial competitiveness, with the aim of discovering a broader range of industries and learning from some of the best practices to bring back to the maritime industry. Missions in the maritime industry involved the transformation of an operational model and the re-design of an industrial site for a group of the CAC 40.

I am now pursuing an entrepreneurial route in the maritime sector. I am grateful for all those people from the maritime community who helped me grow professionally. I would highlight the importance of having role models and mentors as a young engineer.

We are currently experiencing exciting times for those wanting to work in the maritime world. With the arrival of digital tools, there are so many opportunities to improve our industry and make a true impact on our society. I would therefore strongly recommend a career in the maritime world to any women; the challenges ahead are great and so is the life that goes with it. We should all recognise that men and women are complementary and can achieve great things when working together. Finally, I would like to share Professor Jacques Hadler's saying: "Work hard, play hard!"

Marion James



Women in the Institution: 2019

Michelle Jeffrey MRINA

Ever since I can remember, I have always wanted to pursue a career in engineering. I grew up on the south coast of England and have always been fascinated by the sea and ships. Naval architecture seemed to be the perfect choice for me when I was considering what degree course to apply for. I was able to secure student engineer sponsorship with the UK Defence Engineering and Science Group and undertook a pre university year of training at the Royal Naval Engineering College Manadon. When I started my degree in Naval Architecture and Offshore Engineering at the University of Strathclyde, I knew I had made the right choice and never questioned studying anything else or working in another field.

I have been very lucky with my experiences in the maritime sector. Whilst based in the UK as a graduate naval architect I was able to travel worldwide with my work and specialised in hydrodynamics for a short time. My career then led me to Australia, where I now specialise in maritime risk and safety. I continue to work on many interesting projects in Australia and worldwide.

My role model has been my auntie, Janet Thomson who is a British geologist and was the first British woman scientist to complete field research in Antarctica. After years of quiet persistence, she was finally allowed to join her male colleagues in the field. She demonstrated that giving women the same opportunities as men was a positive step forward.

My experience of being a woman in the maritime sector has on the whole been very positive. My gender is rarely a consideration although I recognise that there are still relatively few women in naval architecture. Only I and one other female graduated from my final year at university

Sadly, some prejudice does still exist. There was one occasion when I was onboard a ship with a colleague during sea trials and I was told by a member of the ship's crew that a ship was no place for a woman, and I should not be doing a man's job. I calmly responded to this by stating that my gender made no difference on my ability to do my job I was just as qualified and capable as my male colleagues.

I can see that the future for women in the maritime sector is exciting as technology and opportunities evolve. I hope that I continue to see the number of women in the sector increase, and not to be such a rarity.

I am passionate about my job. My current role is challenging but I love it and work with great people. A career in this field requires a person to solve problems, develop solutions, think innovatively and be a good communicator. Gender does not change a person's ability to do these things and I would recommend pursuing a career in naval architecture to any woman.

Michelle Jeffrey



Women in the Institution: 2019

Monika Ogorék AMRINA

I studied Ocean Engineering at Gdansk University of Technology where I met people who were focused on ships, yachts or other related facilities. My lecturers inspired me to choose this direction for my career while I was studying different kinds of subjects. Then I obtained a Bachelor degree and now I'm continuing, extramurally, a master's degree in Ocean Engineering, because I have decided to work in maritime industry and I wanted to be more independent in my adult life. My time at University provided me with general knowledge to help my career to take off and to look at ships from a different perspective - as very complicated constructions but, incredibly, the most important mode of transport.

At University, I joined the Youth Maritime Forum of the Alumni Association Gdańsk University of Technology Shipbuilding Department KOGA. This is the only student organisation in Poland which is focused on promotion and development maritime knowledge in various areas. In this organisation, I was appointed the Project Leader. As Project Leader, I wanted to show younger people that there is more the maritime sector than they might realise, so I organised special training for young people to better understand ship's drawings, which could be more useful in their future work. Another important thing means by which I tried to attract young people to maritime sector were special meetings with people who wanted to share the best practise in maritime sector during their careers. These were small group meetings because I wanted to show as much as possible to every participant.

Since 2018 I have been a member of Polish Society of Naval Architects and Marine Engineers KORAB, and in 2019 I became an Associate Member (AMRINA) of the Institution. What organizations gave me in my work life: My aim was to attract young people to maritime industry because I believe this type of work is the most attractive market for everyone and it does not matter which studies or interests people have because the ships are indeed 'floating islands'.

I started my professional life with a 3-month internship in a Polish shipyard. During my internship, my supervisor was a constructor so I could see what various types of shipbuilding looked like. After this period I was employed in administration. This was only for 3 months but it was a good learning experience especially in organizational way. Then I started to work in Associations Polish Maritime Industry FORUM OKRĘTOWE. During my work with this Association I could get to know the maritime industry from a different side, e.g. how important it is to represent our Polish Maritime Industry abroad or in the Polish government. Also this job gave me an opportunity to meet more experienced people in maritime industry. Then I wanted to start work in production, so in 2018 I changed my job. I now work in an electrical company with a range of electrical services and products for the maritime industry, so I can look at ship from the electrical/automation side. In this job I can understand how the different machines on the ship work together.

I think working in different places and looking at the industry from different angles has provided me with a bigger picture of how important it is to understand the whole process of shipbuilding, how many people work there and what to do and how to achieve it.

Monika Ogorék



Women in the Institution: 2019

Nadezda Poliscuka AMRINA

I have been in the maritime industry since 2012. I enrolled in my first Maritime Academy in 2011 and since that time the greatest part of my life has been related to the marine engineering.

My father is an engineer onboard a chemical tanker. My own dream to take the same lifeway existed long time before. Unfortunately, in the history of Independent Latvia there were not any previously registered woman marine engineers. Therefore, it took many years to find the way and apply for the studies. Being curious about the whole vessel construction and architecture, in 2012 I entered the Naval Academy in Russia to study Navigation. And finally, in 2013 I have applied for studies in Lloyds Maritime Academy in order to take Marine Accident Investigation course. Since 2012 I'm sailing on merchant navy vessels and from 2015 I'm working as polyvalent officer onboard very large gas carriers.

Currently there are still not so many women in this industry, especially those who work onboard as engineers. Stereotypes about woman-engineer are so strong that it takes years and years to change it. The general situation with female engineers at sea differs depending on culture and country. Nowadays Western European countries have developed ways to support and encourage women to go at sea, and each next year the number of female engineers increases in these countries.

In the Eastern part of Europe the situation is different. If girl decides to become a naval engineer, usually for first five to ten years she will have to prove that this job can be handled by woman as well as by man. There are still women graduating from naval engineering faculties in Eastern Europe but they almost never choose to work at sea.

Things are changing in maritime sector. With more time passing, the attitude towards female marine engineers becomes more positive. Most women quit the sea for family reasons. Today the average duration of contracts is 3 to 6 months. With such a schedule there is very little chance to have time with the family. On the other hand, there are always good job opportunities ashore.

Would I recommend this job to other women and young girls? Yes, but only to those who wish to become a high-level specialist in this field and are strong enough to not be affected by stereotypes.

Today, modern technologies have developed so much that there are many opportunities for naval engineers, not only onboard, but also ashore. This industry is so big and requires various specialists in different subjects. If naval engineering is inspiring to you, then it is worth to take this shot.

I went to sea when I was 25 years old. Now I'm 32 and plan to expand my knowledge now in naval architecture. I still have to prove time-to-time that I deserve my place as marine engineer onboard. But my job is bringing me so much pleasure that I don't regret my decision and I am glad I made this choice.

Nadezda Poliscuka



Women in the Institution: 2019

Nancy Georgantzi MRINA

Why did I become an engineer? Born in Greece and growing up in a traditionally maritime country, I was amazed by the construction process of ships of every size and type. Also, I always enjoyed maths and problem solving, so engineering studies appeared to be the obvious path to follow. I studied Naval Architecture & Marine Engineering at the National Technical University of Athens (NTUA)

Always enthusiastic for more knowledge and experience, I spent some of my early career years doing both research work in NTUA and also working in the 'field'. I have been involved in the pre-concept, concept and detail design and supervision of various types of commercial vessels.

I have had the opportunity to work with very good and supportive professionals but I have also experienced stressful moments. Working in industrial environments was not always easy especially 10-15 years ago. In the male dominated Greek dockyards, people were not always happy to be given advice or be supervised by a woman engineer. Sometimes customers showed dissatisfaction when a woman engineer appeared in the meetings or in site. Being persistent, selective to my career steps and focused to my targets, I gained respect quickly and built an excellent professional profile.

When offered a job in Babcock in 2012, I had the chance of a life and career change, I moved to the UK and altered my career path from the design of commercial vessels to naval ships. Working in a company which encourages diversity and creates a safe environment for their employees I have been able to focus on learning all the new information and be productive. I worked in Devonport Royal Dockyard, where I was involved in a wide range of projects concerning the maintenance and construction of Landing Crafts, Landing Platforms, Offshore Vessels, Frigates and Destroyers.

I am currently a Senior Naval Architect in Naval Design Partnering (NDP), which is a partnering of MOD and industry to deliver innovative design solutions for the current and future fleet. I have been in this role the last two years, where I have enjoyed working alongside MOD customers and stakeholders through a variety of future ship design projects. It has enabled my networking and continuous learning, both personal and team work, together with brainstorming and research.

Today, after all these years of work, I feel that although I have opened my horizons significantly, there are still so many things to learn about Naval Architecture and Ship Design, and in my opinion this makes my profession so attractive. It is important that at the end of the day I feel that I did something I enjoyed and made another step to improve myself.

What is the future for women in maritime industry? The pace of advances in technology and the future challenges require more 'bright brains' to join the maritime sector, both men and women. I am glad to see more women joining the workforce every day. However more efforts should be made to communicate how creative the maritime sector is and why it is a rewarding career.

Women in the Institution: 2019

My message to young women is that working in the maritime sector is not a gender issue. It is for people who enjoy the variety, are keen to learn and want to be at the forefront of the technology revolution. It is for everyone who wants a career where they will get huge satisfaction from problem-solving, being creative, working with clever people. It is for everyone who wants to feel that they are making a difference.

Nancy Georgantzi



Women in the Institution: 2019

Neda Jansepar MRINA

I was born and raised in Tehran, Iran, where my journey as a Naval Architect started. My mother was a teacher and my father a telecom technician. My father often travelled across the country for his work and brought us souvenirs, the most memorable of which was a T-shirt that had a fleet of dinghies in full-blown sails over a deep blue rippled patch of water on a sunny day. That image sparked my strongest interest in learning about boats.

Years later, I chose to study Naval Architecture as an undergraduate student, despite having not yet seen a ship in real life, beyond images of burning ships on the TV news during the 80's war on oil tankers. My strength in physics and maths helped me pass the nationwide university entrance exam (a vigorous race for free public education in Iran). I was able to gain a seat in one of the best universities in Iran and after graduation, I was very fortunate to obtain some unique opportunities to work in India, Australia and Singapore.

Throughout my career, different roles within design offices, shipyards and occasionally on board vessels have given me the opportunity to work with various cultures and, at times, challenges too. One of the best experiences was the extra care and hospitality offered to me as the one and only foreign member of staff during my time in India. In contrast, in Singapore, I was part of a diverse team of 32 nationalities, an experience that I am very proud of. Nonetheless, I have also experienced my share of challenges, especially with regards to gender bias. While most professionals look beyond gender or nationality, in a number of occasions I came across not so friendly comments, which I either ignored, or worked harder to prove my abilities.

I moved to the city of Bombay, shortly after my first and only work experience in Iran (South Pars). Soon after, I started working at the Indian Register of Shipping. This enabled me to gain useful experience on ship classification and regulatory requirements and offer my Transportation and Installation experience to the clients.

In 2007, I joined Prosafe Production team in Singapore to work on the Azurite FDPSO conversion, a project I fondly remember for its unique design features, grand scale of engineering, construction, the vessel hook-up and positioning offshore Congo. The Azurite experience became a great start for me in the floating production sector. Despite the sector's reputation as a male-dominated industry, about 40% of the Naval Architects I have met in this industry have been females. For example, in my previous role, for many years I and my female manager were the only Naval Architects in the company. Nearly half of my fellow graduates in Iran were women, though few chose to work in the same field.

Undoubtedly, over the last few decades, there has been a global surge in numbers and the cultural appetite for diversity. Though, I believe more could be done to make it a more comfortable place for female workers to flourish and fulfil their career dreams.

In the execution of large-scale projects, the movement of professionals has been mandated by the global demand for experts. This is perhaps the reason twelve years have passed since I first moved to the Lion City, as I now look forward to my next career move.

Neda Jansepar



Women in the Institution: 2019

Ros Downs MRINA

As a child in the 60s and 70s, I enjoyed being outdoors by the sea and visiting ships and ports, together with finding problem solving and making/dismantling things fascinating. So it was no surprise that I embarked on engineering, specifically a degree in Naval Architecture at Newcastle University. There were circa 40 people with only a few being females, but a much better ratio than other engineering courses.

When we went on a field trip to visit offshore oil rigs being built up at Nigg Bay and Aberdeen we tried to go on an active British one, but in those days they did not allow females onboard. I also tried to get some seagoing experience, but it was very limited for females - many Captains still did not allow cats or females on the Bridge as they thought it would bring bad luck. However, I was lucky enough to go onboard HM Submarines while they were in refit to undertake some Non-Destructive Testing, particularly Ultrasound which was still relatively new and still being developed.

In 1981 I graduated and joined VSEL in Barrow now part of BAE Systems. It was a great place to work for a Graduate Naval Architect as they covered design build & commissioning on both ships and submarines. I was encouraged to become familiar with the Design Offices and this included time with the MoD, but I really wanted to work in Production. This was the first time since the War that a female had shown an interest in taking up a management post in this environment although there was a female welder and a female fitter at the time. Unfortunately, there are still very few females in this environment, but I enjoyed every minute of it.

While in production, I was asked to lead a team to look at why women left this business when they married and had families. The company was short of key skills and knew that many of the female leavers were still around and had the appropriate skills. We looked at part-time working, job-sharing, flexible working etc., some of which were initiated. After maternity leave it was not so easy for me to be in the Production environment and I had already moved into the Project Management world so worked my way up the Project management ladder. I was the Senior Project Manager for various large complex warship design & build projects as well as being a Project Management Authority within the Business. During this time there were a few challenges being female, including one of my bosses suggesting I could not be promoted until I was back full time. I then went for interview for another role in the same Company and was promoted!

I served on various committees in RINA committee, very often being the only female. This was at particularly interesting time with mergers being discussed with the Marine Engineers and the Herald of Free Enterprise disaster.

I retired in 2017 after 36 years in the Shipbuilding Industry but I have not given up visiting Ships or ports and being out in all weathers. I am now a Ship Welfare visitor for the Mission to Seafarers, visiting ships when they come into port focusing on the wellbeing of the crew.

Ros Downs



Women in the Institution: 2019

Roxanne Lek AMRINA

Warm sun rays, cool sea breeze and a starry night sky - those were the memories I would recall while growing up. My family would go on fishing trips on small boats and take boat rides to various islands around Singapore. I remembered asking my Dad how boats can move and travel so fast; they do not have wheels. It was these curious buds that led me to my education and career in naval architecture and marine engineering.

In 2006, I was privileged to be selected for a Management Trainee Programme with Keppel, an international company that is one of the world's largest and best offshore rig builders. It has a great graduate training programme that gave ample training to a fledgling graduate like me. This provided a rare opportunity of being one of the first few women to superintend operations when I led a team of workers in construction projects. This was in rather stark contrast to most of my deskbound peers; an opportunity I am very grateful for.

A fond memory is of being the first woman on the last section of a jack-up leg which was approximately over 90m high while it was being constructed. I still have vivid recollections of workers cutting and welding leg sections while the sun gradually sets in the backdrop, signaling the end of another working day.

After completing my Naval Architecture degree in 2010, I attended various technical talks conducted by the Singapore Joint Branch of RINA & IMarEST which broadened my industry knowledge of the industry and my network. I eventually served as a member of the Committee, as Assistant Secretary in 2015 and Hon. Treasurer in 2016. I am grateful for the opportunities to meet, learn and receive guidance from industry experts.

I was involved in various roles ranging from operations, engineering, commercial and marketing before making my foray into being an analyst. Some of my proudest moments in my career include the opportunity to complete 40 EPC projects which honed my skills in project management. The many letters of appreciation for outstanding performance from various clients were recognition to my efforts and proficiencies.

In my current role as an analyst, I use data analytics to achieve data-driven decision making process. This includes integration of technology and business process. I would evaluate relevant information that enables the company to make informed decisions about more of its business and marketing needs. My specialization in the marine and offshore industry has enabled me to better interpret data and provide valuable insights.

Throughout my career there were times when the work environment is tough. However, I value the friendships that were forged through overcoming ordeals during a project. Completing such complex projects as part of the team is both fulfilling and a memory to treasure.

In recent years especially in Singapore, there are more women graduates assimilating into various roles in this industry. This leads to an improvement of working environments such as an inclusion of women's toilets in strategic areas as well as setting up of nursery rooms.

Women in the Institution: 2019

The marine and offshore sector is a great industry for everyone who is passionate about offshore structures, and ships, and loves technology. It is an exciting industry where companies are evolving with times and embracing technological advancements of Industry 4.0 as well as efforts towards more sustainable shipping. The marine and offshore sector is a great playing field with many career opportunities for an individual to hone her skills and experience.

Roxanne Lek



Women in the Institution: 2019

Sarah Vinson MRINA

I was finishing my A Levels at Chatham Grammar School where it seemed that the careers' advice focussed on going into either nursing or teaching. I persevered in those rejecting career options and chose to study engineering. I homed in on naval architecture, in part due to the inspiration Chatham Dockyard Naval Days in the 60s and 70s had given me, and also from the support from my mother's cousin Jack, who worked in Chatham Dockyard. My parents were not keen for me to leave home to study and so I became a 'commuter student' from my home in the Medway Towns to UCL, London where I began my studies under Professor Rawson in 1974. Jack frequently met me on the train, where we had long discussions about the lectures and the opportunities the profession would give me.

My all-girls school left some gaps in my skill set. I had obviously not studied woodwork/metalwork, but I had also never used a slide rule before either and it was this that created the most problems. When I first produced my well-thumbed log tables during a lab session, there were looks of total disbelief! I quickly went out to buy myself a slide rule and a taught myself how to use it on the train journeys – no more log tables! The use was short lived as towards the end of the first year, the first scientific calculators became affordable for students and the slide rule was abandoned.

There were a couple of memorable interviews with two of the largest shipbuilders in the south east when I was about to graduate. On both occasions, the interviews spent most of the time discussing whether employing a female graduate would be a worthwhile investment! Leaving to get married and have a family were cited as 'potential issues'.

Following several summer jobs at Lloyds Register of Shipping – I decided to continue my studies with a Master's degree at Cranfield Institute of Technology in Offshore Structures but swapped course after a few weeks to Aircraft Design and specialised in Naval Aviation. My studies created a real interest in structures and for the next twenty years my career focussed on helping other engineers validate that their structures were fit for purpose, primarily using finite element analysis. I was involved with the structural modelling and analysis of military aircraft, offshore castings, oil pipelines, oil tankers, helicopters, car components and a racing yacht that completed in the Whitbread Race in 1984. I also managed a team in partnership with DRA Farnborough to help develop their structural optimisation software for thin walled structures and this was used by the Airbus design team to optimise the tail fin of the A320 and A340 aircraft.

I joined the CEI initiative 'Opening Windows on Engineering' as a young ambassador, and gave over 40 presentations to local secondary schools with a talk entitled 'Will it break?' It was a successful programme which highlighted how important it is for engineers to engage with students and help them become excited about the career opportunities in engineering.

I have never regretted choosing a career in engineering and whilst Naval Architecture has only been a small part of this, I am proud to be a Chartered Engineer and to have been able to encourage the growing numbers of young women choosing to join the profession.

Sarah Vinson



Women in the Institution: 2019

Sarah Watts FRINA

Unlike most naval architects, I didn't leave school and take the direct route to Naval Architecture. I started my working life in a bank and over time realised that it wasn't really the job for me. Following a number of fill in jobs and some fantastic travelling experiences, I decided to combine my interest in all things maritime with my abilities in mathematical subjects and study Naval Architecture at university. At this time (1994) I didn't know any naval architects, I had no idea that I could study the subject at university and I had never heard of RINA. I subsequently received a scholarship for my studies and I recall walking into the scholarship interview at RINA HQ and being inspired.

I have progressed in my career from a humble naval architect undertaking hydrodynamic research to a Business Group Manager responsible for a group of 100+ Naval Architects, Scientists and Engineers. During this time I have been part of a team trialling a trimaran technology demonstrator in rough weather trials through to leading a programme of work developing a new method to model the hydrodynamics of deepwater offshore systems, which was widely published. Using my previously learned commercial expertise, along with my technical expertise, I helped transform legacy research capabilities to ensure they were appropriate for the future technological challenges.

My initial RINA funded scholarship helped launch my naval architecture career but my relationship with/participation in RINA activities continued throughout my career. Over time I have been a member of both the RINA Membership and the RINA IMO Committee. I have additionally served on Council, been Vice Chair of the RINA Executive Committee (precursor to the Board of Trustees) and have had the honour of being elected by my peers to Chair RINA's Safety Committee.

Working in the maritime industry has been a very positive experience. Most areas I have worked in have recognised that women bring a different perspective on issues and positively change group dynamics. However there is still more work to be done as there are some parts of the industry where women are still not recognised for their full contribution and potential. It is hoped that this will become less common in the future.

I would highly recommend a career in the maritime industry as it offers many different satisfying paths. In my case this has included such diverse areas as time at sea and model testing, as well as other areas including the commercial and managerial aspects of our industry.

Sarah Watts



Women in the Institution: 2019

Sindhu Dasan MRINA

The most common question asked in my career as Naval Architect is why chose this profession. At the young age of choosing this stream, I was naïve and looking for a job which promised a course place in the university closer to home. But now, 23 years down the line, I am immensely proud and honoured to have chosen the naval architecture profession, which itself is an identity to the world. Happy moments are when people come up to you, offshore or on-board vessels, and ask what you studied for this job, and say that this is what they want their daughter to study.

Since graduating from Cochin University of Science & Technology, I have gained experience in a wide spectrum of activities in oil and gas and shipbuilding, starting in ship design consultancy firms in India & UAE, ship/boat building yards, marketing/estimation for new build, composite & ship repairs, construction planning, Marine Warranty Surveyor for Oil & Gas, Pipe lay & Jacket/Topside installations. In my present position in the Petrofac Sharjah office as the Module / HL / ODC Logistics Manager I am responsible for planning and executing Module, heavy lift and over dimensional cargo movements from around the world to UAE etc. and recently completed a beach landing facility operation in Sakhalin Island, Russia. I am now a Chartered Member of RINA which has added respect to my name.

Throughout my life, I have learned that with hard work, grit and perseverance there is no limit to what you can dream and achieve. Overcoming our own fears is the biggest achievement which gives satisfaction over anything else. Our setbacks can be used as lessons and non-inspiring treatment/words by others could turn to be our best inspiration. Be happy with the people who enjoy, support and guide us and be thankful and let go others who give free lessons in life.

The marine sector is vast and holds resources which are yet to be explored. Water as a medium can be utilised in the future digital/AI era with unlimited opportunities. Every step made by a woman in the maritime sector is slow and steady progress for women kind because change is inevitable. Supporting our fellow personnel and delivering results in a corporate world in an assertive manner but with the natural empathetic behaviour of women will take us a long way. This is where women can always make a difference, working hand in hand with the excellent men in the industry.

After having come across lot of people who said women could opt for other more fulfilling careers, I personally would welcome girls and women into naval architecture as a career. It is a field where you're easily noticed and given opportunities once proven. It is one where you can stand out with your head high. Who would not want the attention that when you're lowered into a construction vessel offshore from a Billy Pugh, everybody on the deck or vessels nearby stop their work and watch you, or when going on board ships or construction vessels, you are given the best room available, maybe the Captain's! We have walked and progressed along the path that eminent women have walked and struggled over many years, but we need to progress further to ensure a better legacy for the women naval architects of tomorrow.

Sindhu Dasan



Women in the Institution: 2019

Sophie Chudziak MRINA

I have been working in the maritime sector as a naval architect for 12 years - how time flies! At school I liked maths and physics, so I naturally went on to study mechanical engineering specifically applied to ships. Mechanical engineering applied to ships is very diverse and allows the application of various principles on a large scale; structures, hydrodynamics, machinery, vibration... That is what appealed to me rather than working in the car industry for instance where I may have ended up designing a headlight for months. During my time at university I never questioned my choices based on gender and was never held back.

I started my career in a software company. The software was designed to help naval architects design ships from concept design to through life assessment. My work involved testing, training new users and consultancy work. I undertook many projects including superyacht concept design, stability calculations and structural assessment. Training others is rewarding, and I have always learnt something from the professionals I met. They were experienced people designing ships so regularly had something to teach me. Being a woman in a sector that is male dominated often meant they would remember me more easily which helped in terms of marketing and client relationship.

Then I wanted to see real ships rather than digitised ones, so I changed job. Now for part of my activities I go on board, instrumenting propulsion shafts to understand shaft behaviour under load and for vibration investigation purposes. That can involve carrying heavy boxes of equipment, crawling on the oily dirty tank top, working long hours when some installation does not want to behave and it's great!! Solving problems on my own is very rewarding or when working with colleagues it brings the team closer together. When data is collected from the trials and the analysis stage starts and it is great to see the numbers matching what was expected or having to scratch your head and dig deeper to fully understand the results. I find it a good balance of practical experience and analytical work. Gathering real life data to match the theories that have been developed over the years is fascinating.

Working in shipyards has never been an issue for me as a woman, apart from the odd inconvenience such as finding the ladies toilet or having overalls that fit properly. Male workers might be surprised to see me, but I have never been disrespected and it appears they would help me carry boxes more than if I were a man.

I like working in this industry due to the technical side and challenges and would recommend it to anyone who likes problem solving and mechanics whether they be woman or man.

Sophie Chudziak



Women in the Institution: 2019

Irina Tănase StudentRINA

I have been studying naval architecture for three years at the “Ovidius” University of Constanta, Romania where I am taking the first steps in my future career. I chose this subject because I was raised in a maritime environment, so I developed a great interest for this industry. This way I discovered my capacity to gather, analyse and implement projects, presentations, subjects to explore etc. Even though I am a woman in a man’s field, it does not prevent me from being one of the best. Thus I won the Excellence Award in Education, within the Excellence Gala, marking a great moment in my student life. The second great moment was becoming a member of the Institution, which is giving me a great opportunity to develop and achieve a vision for the future.

I discovered the Institution by accident. I had read a lot about the Institution and I wanted to become part of it and so I am now a member because it was very open and welcoming. As a Student Member, I was able to participate to Damaged Ship IV Conference, where I met many of the professionals of this field.

Studying naval architecture is not easy. There are math classes and new software ready to be discovered, long projects to be finished and a lot of work to do. But when the project is complete with a giant, complex structure, the emotion is rare and hard to be compared to anything else. I would recommend this field of study to any woman who is prepared to become part of a great, open and challenging industry.

In my short experience, I think that a woman has the ability to be in any field she thinks suits her, as long as she is passionate, ambitious and motivated by it. The future is brighter day by day for every each of us, because every day a woman makes a difference in various fields, the world will not forget our effort.

Irina Tănase



Women in the Institution: 2019

Verity Thomas StudentMRINA

It is exciting but shocking to realise that it has been only 100 years since women could join the Royal Institution of Naval Architects. I am currently at Newcastle University studying Marine Technology with Naval Architecture, and am on my placement year at Babcock based in the Devonport Dockyard in Plymouth.

I chose to study Naval Architecture because I enjoy water sports such as sailing and rowing, and wanted to do a vocational degree with good job prospects so investigated how I could combine both. Initially I wanted to become a ship's Captain because I love to lead and being on a ship in the clean fresh air and bright stars at night – a stark contrast to growing up in central London! However, I discovered that is *not* what Naval Architecture consists of. Nevertheless, I grew a love and respect of the field and Britain's rich maritime history. So far, I have learnt the engineering basics and discovered the numerous industrial roles whilst working at Babcock and far too much about paint and corrosion!

The maritime industry can be a lucrative career for women and girls today, full of lots of opportunities. I have managed to win scholarships at my university such as Charles Letts, and awarded by the UK Naval Engineering Science Technology group, as well as being shortlisted for the Nova Prize which recognises outstanding early contribution in the STEM field. If you are a bright and proactive person, you'll be able to make the most of the opportunities out there. About 10-20% of my course is female with many from the UK, Greece, and Asian countries, and this shows that there is diversity, but there is a need for more gender balance. Most naval career paths give the opportunity to travel, if you wish, or work with the armed forces and accordingly I am considering joining the Royal Navy as an engineering officer.

There are many challenges facing the maritime sector such as rising costs of necessary materials, security risks, new regulations, and lack of experienced employees. Therefore, the need for new talent in the industry is so important and women add hugely to the diversity of thinking because of the differences in genders owing to physiology and societal expectations. There are many roles in the field beyond engineers, from ship brokers to environmental roles and beyond. I would recommend the maritime sector if you have an interest or appreciation for nautical history and are excited by developments in technology such as the 'Internet of Things', artificial intelligence, and drones which have the potential to drastically change the industry.

Verity Thomas



Women in the Institution: 2019

Victoria Conway AMRINA

Since Secondary School, I have always enjoyed and thrived on maths. This partially stems from having such a fantastic teacher who encouraged me and drove me to be my best. The next logical step after school was to study engineering at University and develop a career in something I loved. Naval Architecture was and is considered an unusual choice for women, but this made it sound all the more desirable to me.

I attended the University of Strathclyde and after 5 years achieved a Master's Degree in Naval Architecture and Marine Engineering. Shortly after, I received a place on the BAE Systems Graduate Scheme where I was to spend two years within the business, working with many different disciplines. This was certainly a highlight as it allowed me the opportunity to contribute to two military contracts. Whilst on the scheme I was introduced to STEM and given the opportunity to manage a programme which encouraged school children to consider a career within engineering and in particular, Naval Architecture. This was a perfect opportunity to inspire and support a future generation of young engineers.

My current position within BAE Systems is with the Type 26 GCS Structures team. Having been in this role less than a year, I can honestly say I have learned so much. I can attribute this to having such a strong female lead within the team who constantly challenges my abilities and, as with my maths teacher, pushes me to flourish. One way in which she has achieved this is by encouraging me to apply for the Women & Leadership Executive Ready Course, which I did, and was given a scholarship for. My hope is that this course will inspire me to seek out career development opportunities as well as provide me with the skills to be able to successfully mentor and motivate individuals, especially women, in the same way that my manager has inspired me.

Even although there is still a long way to go, I am confident that more and more females are considering a career within the maritime sector. A perfect example of this is an article recently published by BAE Systems for International Women in Engineering Day, 26 women working within the Type 26 programme, to promote the variety and number of talented women working within the Company.

Victoria Conway



Women in the Institution: 2019

Vira S Mitienkova AMRINA

Nowadays, it is declared that men and women have equal opportunities and possibilities in all spheres of economic activity and industry, including the maritime industry. However, how is it actually to be employed in the marine industry if you are a woman? I would like to share my own experience of being a woman in the maritime sector.

To begin with, why did I choose to embark upon such a career? Honestly speaking, I did not have much of a choice, because Mykolaiv, my native town, was a center of shipbuilding industry in Ukraine and the former USSR, and my future alma mater, National University of Shipbuilding, former Mykolaiv Shipbuilding Institute, was considered to provide a promising start to an engineering career. Unfortunately, in the early 2000s Ukrainian shipbuilding industry was depressed, but nevertheless, some perspectives remained.

My next step after obtaining Bachelor and Master degrees in power engineering was postgraduate study in marine engineering. I guess I have achieved a lot in my career during last 13 years after graduating from university. Today I am an Associate Professor at the Marine and Stationary Power Plants Department of Admiral Makarov National University of Shipbuilding, and have a PhD in technical sciences. In 2007, I became an Associate Member of the Royal Institution of Naval Architects; it is my great honor to be a part of this respected professional society. Moreover, in 2014, I become a laureate of the Prize of the President of Ukraine for Young Scientists. Today I am an Associate Professor at the Marine and Stationary Power Plants Department, Admiral Makarov National University of Shipbuilding. Additionally, I am an author and co-author of more than fifty scientific papers, including articles and monographies.

Taking into account processes connected with equal rights for all genders in the modern society, I feel the number of woman in the maritime sector will grow. No doubt, that they will hold more top positions in shipbuilding and ship owning companies and various maritime organizations around the world. Moreover, I hope the number of female employees in maritime sector will increase not only in the marine design bureaus, shipbuilding plants and maritime educational facilities, but also in ship crews.

To conclude, I would recommend pursuing a career in maritime industry for woman and girls today and in the future, of course, if they have the inclination to such activity. There are so many ways to realise yourself in marine sector, to continue growing and developing. I hope that gender equality will further be supported, and my own experience may inspire other women to choose maritime career.

Vira S. Mitienkova



Women in the Institution: 2019

Yildiz Sarac-Williams MRINA

I was born and brought up in Istanbul's old town on the European part of the city. As a child, we visited my grandparents almost every weekend and they lived on the Asian part of the city. This meant taking the ferry to travel across the Bosphorus straight which I loved very much. The ship always intrigued me with her great white wash when leaving the dock, the sound of the horn, thick mooring lines thrown over to a bollard, rickety wooden walk bridge. All of these were exciting and when the weather was rough, the ship's rolling and rocking made it even better.

When I was in my teens, I decided that I wanted to be an engineer. I loved maths, physics and science; and wished to have an occupation that would entertain all my interests. So, having such fond memories of the sea and ships combined with my school interests led me to the decision of studying Naval Architecture.

I have been a naval architect for 21 years and I worked on so many interesting projects, worked with great people and have seen amazing places. I have learned so much during my career and still doing so.

I can see a big improvement in attitudes in maritime sector towards women compared to when I first started working in shipyards as a young intern. I think the maritime sector can see how much women can offer for the future of the sector. I believe in diversity in every industry to bring differences together, looking at problems from different points of view, and finding solutions from every angle for the greater good of improving safety of life and environment. I think we still have a long way to go to be more diverse and inclusive which is why I would recommend working in the maritime sector and engineering to women and girls as they can have an interesting career and make a difference in so many ways.

Yildiz Sarac-Williams



Women in the Institution: 2019

Zihan Ma StudentMRINA

At present, maritime power strategy is being implemented in China. The necessary way to realise a peaceful rise is to enhance marine soft power. As Chinese, I am proud of my country. At the same time, I would also like to be a part of this event. I want to learn about the manufacturing technology of the ship. I want to learn about the construction of the Marine knowledge. I want to learn how to protect the ocean, the use of resources. I want to

What's more, marine problems are commonly also the concern of other countries. How to operate more freely in the vast sea for human development, and how to make reasonably use of marine resources are also the search targets for other countries

Another factor contributing to my choice is that I like it! Although I am a girl, I do not want to choose the financial, accountant and other careers that people think a girl should choose. I like scientific research and I enjoy the kind of loneliness which comes with scientific research. In my opinion, that is amazing. And that would be enough to keep me absorbed in surprise.

So with interest in scientific research and the love of country, I choose to enter the Wuhan University of Technology to Naval Architecture and Marine Engineering after the college entrance examination in June last year. When I entered the university, I began to study hard about this knowledge, and I usually focus on news at home and abroad.

I believe I will firmly go on the road of the scientific research. I believe I will carve out a successful career in shipbuilding. I believe China will become more prosperous. I believe that the world will become more beautiful.

Zihan Ma

