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ARTICLE



## When protons were gendered: women in the School of Physics and Mathematics of the University of Athens (1922–1967)

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### ABSTRACT

The first women in Greek academia appeared during the period in question (1922–1967) and entered the ivory tower by overcoming difficult conditions and circumstances, often with many restrictions and setbacks. This essay focuses on the School of Physics and Mathematics of the University of Athens, documents quantitative and qualitative data on the female presence, and illuminates the different experiences of women practitioners while, at the same time, attempting to address the question about the gender-based characteristics which penetrate Greek academic life and scientific endeavour. The access of these women in the scientific staff of the School of Physics and Mathematics is related to issues of social class, social networks, personal and family relationships, and political context. Their contribution and status are investigated within the general conditions that govern university as an institution and a microcosm – competition and rivalry, scientific controversy and consensus, multi-hierarchical relationships, and accumulation of power.

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### The questions: woman, physical sciences, University of Athens, society

The first part of the title paraphrases the question asked by Megan Urry, Professor of Physics and Astronomy at Yale University: “Are photons gendered?”<sup>1</sup> We have used “protons” instead of “photons” and the affirmative rather than the interrogative. This is because the subject, which is the “academic microcosmography” of physical sciences at the University of Athens, refers to a “model” that has analogies to the atomic model as presented in Ernest Rutherford’s 1958 historical experiment.<sup>2</sup> These analogies are both eloquent and imperfect, as all analogies are.

The historiography of the physical sciences included aspects related to the connection of gender and science when it went from trying to recount scientific theories to attempting to

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<sup>1</sup>Megan C. Urry, “Are Photons Gendered? Women in Physics and Astronomy,” in *Gendered Innovations in Science and Engineering*, ed. L. Schiebinger (California: Stanford University Press, 2006), 150–64.

<sup>2</sup>In 1911 E. Rutherford proposed a model for the structure of the atom. He assumed that all the positive charge and all the mass of the atom are concentrated in a very small area, in its centre, which he called the nucleus. Around the nucleus, electrons, which have a negative charge and a low mass, move in circular orbits, while most of the atom’s space is empty. He drew his conclusions by studying the deflection of positively charged particles (alpha particles) when bombarding a gold foil sheet.

interpret the various factors involved in the scientists' work. Using gender as an analytical tool has enriched and broadened questions related to the political and social context within which the scientific endeavour evolves; the relationships and the hierarchical structures among scientists; the shaping of scientific culture and scientific practices. International literature has begun with a first challenge to document women's participation in science highlighting the social circumstances of their contribution or exclusion. It led to new, more complex and more fruitful questions when it approached the structure and function of science itself, that is, when it eventually examined it as a social institution, as a cultural factor with gendered characteristics, and raised the question of whether these characteristics were incorporated into the very content of scientific knowledge.<sup>3</sup>

This paper focuses on the School of Physics and Mathematics of the University of Athens (hereinafter referred to as "the SPM") during the period 1922 to 1967, documents quantitative and qualitative data on the female presence, and investigates the contribution and status of the first women in the scientific staff within the general conditions that govern university as an institution and a microcosm while, at the same time, attempting to address the question: how do gender-based characteristics penetrate Greek academic life and scientific endeavour?

Since the beginning of the interwar period, the University of Athens had entered a phase of transformation. Substantial changes were to be made, albeit slowly. They were based on the general scientific and educational concerns of the time. The main aim was to develop education in a way that would favour economic activity and contribute actively to the establishment and modernisation of the bourgeois state. The desired changes were also reflected in the University of Athens Law of 1932, which was to regulate the operation of the University of Athens until after the end of the period examined here. Among the major changes introduced by the Law of 1932 were those related to the teaching staff. It took time, of course, before they were fully implemented. However, they encouraged the University to a dynamic process of evolution over the following decades.<sup>4</sup>

Also, during the interwar period, the conditions under which women's rights were raised in the public domain were significantly altered. The notion of "equality in the difference" between men and women which was prevalent till then began to decline. The model of the woman who is active in her home, has motherhood as her mission, and views education as a means of successfully fulfilling her mission weakened. Women's rights were now approached through the "principle of equality". Those who adopted this new principle placed women's political rights at the heart of their views and brought new content to women's education and employment. This was a transition that happened gradually, perhaps even more slowly than the changes in the university institution. In this process of transition, it is important to point out not only the changes but also the continuities that occur, as well as the perceptions and the institutional conditions that feed and reproduce these continuities.<sup>5</sup>

<sup>3</sup>Maria Rentetzi, "Sketching the History of Women in the Sciences," *Synchrone Themata*, no. 94 (2006): 50–61 [in Greek]; Londa Schiebinger, *Has Feminism Changed Science?* (Cambridge, MA: Harvard University Press, 1999); Sally Gregory Kohlstedt, "Women in the History of Science: An Ambiguous Place," *Osiris*, no. 10 (1995): 39–58; Evelyn Fox Keller, "Gender and Science: Origin, History, and Politics," *Osiris* no. 10 (1995): 26–38.

<sup>4</sup>Indicative data shows the significant increase in the teaching staff at the University of Athens after the Law of 1932: 1929/30: 146, 1930/31: 153, 1931/32: 168, 1932/33: 166 and then 1933/1934: 189, 1934/35: 201, 1935/36: 205 (Hellenic Statistical Authority, Special Publications, Tertiary Education).

<sup>5</sup>Efi Avdela, "Women, a Social Issue," in *History of 20th Century Greece*, ed. Chr. Hadziiosif (Athens: Vivliorama, 2002), 337–59 [in Greek]; Efi Avdela and Angelica Psarra, *Feminism in Interwar Greece: An Anthology* (Athens: Gnosis, 1985) [in Greek].

How are the paths blazed by the first women who joined the staff of the SPM recorded and interpreted in this ambivalent environment, which includes revisions as well as reproductions? What general conditions governing the university institution and what specific characteristics of the particular Athenian academic microcosm have determined their contribution to the scientific body of work? How, then, did the way they did things, in the context of choices available and constraints imposed, help shape the culture and practices of the particular scientific community? The paper highlights the participation of the first female scientists in the academic life of the SPM by examining the subject in two sub-periods, which differ significantly and have World War II as their boundary. In order to better understand these two different periods, a rather detailed picture of the female students in the SPM follows in which the trends that their choices followed among the curricula of the SPM are presented in rough lines.

### Female students, 1922–1967: from “the time when they were considered prodigies” to the formation of a multiform image

From the founding of the University of Athens in 1837 to 1904 the physical and mathematical sciences were part of the School of Philosophy. In 1904 the SPM became an Independent School with two departments, the Physics Department and the Mathematics Department. In 1918 the Chemistry Department was established<sup>6</sup> and, four years later, the Pharmacy Department became operational; it had evolved from the corresponding vocational school that had existed since the founding of the University. Two years before the outbreak of World War II, a fifth department, that of Natural Sciences, began to operate, combining biology and geology.

The first female student at the University of Athens enrolled in the Department of Philology of the School of Philosophy in 1890. This was followed in 1892 by the enrolment of the first female student in the Mathematics Department. By 1904, 33 female students had enrolled in various departments of the University, accounting for 0.3% of all enrolments (Table 1). They were young women mostly coming from upper-class backgrounds; having been raised in highly educated environments, they had been able to overcome the inadequate training and the institutional barriers raised by the different type of school education for girls (in the so-called “parthenagogeia”).<sup>7</sup> Among them, were four female students who had enrolled in the Physics and Mathematics Departments (which still belonged to the School of Philosophy).

**Table 1.** Student enrolment at the University of Athens 1890–1904.

	University of Athens		School of Physics and Mathematics		Pharmacy School	
	female students	total	female students	total	female students	total
1890–1904	33	11319	4		2	465
1904–1920	359	18377	21	1788	62	837

<sup>6</sup>Vicky Sigountou, “Foundation of the Chemical Department of the University of Athens: The Long Road to 1918,” *Chemika Chronika* 80, no. 4 (2018): 5–9 [in Greek].

<sup>7</sup>Sidiroula Ziogou-Karastergiou, *Women and Higher Education in Greece: The First Female Students at the University of Athens, 1890–1920* (Thessaloniki, 1988) [in Greek]. In 1895 the Greek state allowed female pupils to receive a high school diploma following special examinations and, after 1907, allowed them to enrol in public (state) high schools.

The picture began to change in the early decades of the twentieth century. During the period 1904 to 1920, 359 female students enrolled in various departments of the University, which was 2% of total enrolments (Table 1) at a rate which increased significantly in the second half of that period. This increase was related to the acceptance of female pupils in public high schools, the expansion of the school network, and women's access to new areas of employment. These changes gradually pushed a larger number of women, some of them from middle-class social and economic backgrounds, to university education.<sup>8</sup>

During the same period (1904–1920), 21 female students enrolled in the SPM departments while a larger number (62) enrolled in the Pharmacy School (1.2% and 7.4% of their respective total enrolments). Poor participation in the mathematical and physical sciences was aptly described as follows: “at the time female students were regarded as a rare phenomenon and remained isolated from the rest of the students.”<sup>9</sup> In such an academic environment, the few women were hardly invisible, precisely because of their small number.<sup>10</sup> They were in a milieu where their presence seemed to be “out of place” and so looked for ways and codes for their public presence in the university amphitheatres and laboratories:

I must mention our fellow student in the Department of Physics, Elli Gitarakou. Very capable in her studies, but scared and unable to protect herself, she was always accompanied to classes by her elderly father, a colonel, who had thus become a reluctant attendant. He would accompany his daughter into the room, looking fierce and sullen, donned in his worn-out uniform and dragging his sword, which rattled along the paved road, and would sit next to her, oblivious to the fun poked at him by the other students.<sup>11</sup>

For the following period we have official data from the General Statistical Service of Greece (first statistical report on higher education published: 1929). According to the data (Table 2), until World War II the female student population ranged from 9 to 14% in the SPM and 7 to 12% across the whole of the University of Athens, at a time when girls graduating from secondary education accounted for 20 to 35% of all pupils.<sup>12</sup> Throughout the interwar period, the SPM was the second school at the University of Athens with the highest percentage of female students, but at the same time it was separated by a large distance from the first (the School of Philosophy) not only in numbers but also in growth rates. The mix changed significantly after World War II. Participation of female students in the SPM increased gradually, but now it also became the School (together with the School of Theology) that had the lowest proportion of female students and the lowest rate of their growth. At the end of the period under consideration, female student participation was at 23% for the SPM and 39% for the University of Athens.

The students' choice of SPM departments was not evenly distributed. Their initial momentum towards studies of Pharmacy was maintained until the end of the interwar period; more than half of the female students entering the SPM chose that department. Their next choice was the study of Physics while still fewer would study Mathematics or Chemistry. These trends changed only partly after the war. An even smaller proportion of

<sup>8</sup>Ziogou-Karastergiou, *Women and Higher Education in Greece*, 38–93.

<sup>9</sup>John Kandilis, *The Founders of Physical Sciences in Modern Greece and Their Time* (Athens, 1976), 22 [in Greek].

<sup>10</sup>Paula Gould, “Women and the Culture of University Physics in Late Nineteenth-Century Cambridge,” *The British Journal for the History of Science* 30, no. 2 (1997): 127–49.

<sup>11</sup>Kandilis, *The Founders of Physical Sciences*, 22–3.

<sup>12</sup>G. Belogiannis, F. Kougioumoutzaki, and A. Kalamatianou, “Gender Participation in Greek Education: A Social, Political and Cultural Issue” (paper presented at the Fifth NTUA Interdisciplinary Conference. Education, Research, Technology. From yesterday to tomorrow, Metsovo, September 27–30, 2007) [in Greek].

**Table 2.** Percentages of female students per school of the University of Athens (1929–1966).

	Physics & Mathematics	Theology	Law	Medicine	Philosophy	University of Athens
1929–30	10.0	1.6	2.7	6.0	24.0	7.1
1930–31	9.2	2.7	2.5	10.2	25.0	7.8
1931–32	9.6	2.1	2.9	6.2	30.2	7.3
1932–33	9.8	2.4	8.8	7.1	35.6	11.2
1933–34	11.5	1.8	4.4	7.5	38.8	8.7
1934–35	13.1	1.8	4.7	7.6	42.6	9.5
1935–36	12.5	1.9	4.8	7.4	43.7	9.1
1936–37	13.2	2.3	5.3	7.3	48.5	9.4
1937–38	13.9	3.5	6.5	7.5	51.2	10.5
1938–39	13.1	4.2	6.4	7.8	57.0	12.2
1955–56	20.2	16.7	18.9	22.1	60.8	28.0
1956–57	17.8	14.7	25.4	23.0	61.2	29.2
1957–58	18.0	17.1	26.2	17.0	61.3	29.4
1958–59	23.2	14.3	29.0	26.3	60.4	32.3
1959–60	19.1	18.5	29.9	23.6	61.4	31.2
1960–61	19.2	16.7	31.9	26.1	63.0	32.5
1961–62	21.4	13.2	33.4	25.7	67.4	33.6
1962–63	22.1	12.4	35.5	27.9	72.4	35.7
1963–64	22.3	8.6	36.7	30.2	72.0	37.3
1964–65	23.1	8.5	37.9	27.6	73.7	36.3
1965–66	23.2	8.0	38.2	30.2	75.9	38.8

The percentages listed in Tables 2 and 3 are derived from the data published by the Hellenic Statistical Service for each academic year. The publication of data on Higher Education began in 1929 and was discontinued for the period 1940–1955.

SPM female students continued to pick Pharmacy, while a major preference lay in the study of Natural Sciences and Mathematics, leading primarily to a career in education.

The gender distribution was not more uniform across the different sections of the SPM (Table 3). Until 1940 female students had a ratio of over 1:5 in the Pharmacy Department; in the Mathematics and Chemistry Departments they were generally lower than a ratio of 1:10; and in the Physics Department the ratio was much lower until the War. This mix also changed in the following years. At the end of this period (1967), there were about as many female students as there were male students sitting on the benches of the Pharmacy Department, while next to each female student of the Natural Sciences there were two male students and at the Chemistry laboratory benches just over a quarter of the students were female. However, it was difficult to locate female students in the Mathematics Department. And it was even harder to locate them in the Physics Department, where the mix was reminiscent of the worst of the pre-war years.

All the percentages reported regarding women's participation in the SPM student body and their fluctuations were shaped by a variety of causes that go beyond the aims of this article. The institutional framework and the social context that generally governed female labour in the respective periods have been sufficiently analysed.<sup>13</sup> However, we may mention, as an indicative example, the legal prohibition preventing female chemists from working for the General Chemical State Laboratory, which was enacted with some explicit wording at the time of its establishment in 1929 and maintained until 1955.<sup>14</sup>

<sup>13</sup>Efi Avdela, *Public Servants of Female Gender: Sexual Division of Labour in the Public Sector, 1908–1955* (Athens: Commercial Bank of Greece, 1990) [in Greek].

<sup>14</sup>Article 9 para 2 of Law 4328/1929 stated that "Only males can be employed as technical staff of the General Chemical State Laboratory". Law 3192/1955 eventually put an end to this exclusion.

**Table 3.** Percentage of female students per department of the School of Physics and Mathematics of the University of Athens (1929–1966).

	Mathematics	Physics	Chemistry	Pharmacy	Natural Sciences	School of Physics & Mathematics
1929–30	4.7	9.2	8.0	19.6		10.0
1930–31	3.3	10.8	6.8	18.5		9.2
1931–32	3.3	12.4	4.8	21.4		9.6
1932–33	2.7	12.3	4.2	24.5		9.8
1933–34	4.6	15.3	6.7	24.0		11.5
1934–35	5.8	13.4	6.2	27.4		13.1
1935–36	6.5	11.5	7.0	25.1		12.5
1936–37	6.4	14.8	8.9	24.3	100.0	13.2
1937–38	5.8	17.4	10.9	25.0	40.0	13.9
1938–39	10.0	16.7	11.2	18.2	36.4	13.1
1955–56	7.8	8.6	12.4	42.4	36.0	20.2
1956–57	8.3	8.7	14.3	40.1	30.3	17.8
1957–58	8.3	9.1	15.8	39.4	32.0	18.0
1958–59	11.6	8.4	20.9	41.5	76.1	23.2
1959–60	12.4	9.2	19.2	43.8	27.3	19.1
1960–61	13.4	10.0	22.1	40.4	30.1	19.2
1961–62	16.0	9.0	27.1	41.6	36.5	21.4
1962–63	14.9	10.8	27.4	42.6	39.9	22.1
1963–64	17.1	10.6	24.6	42.9	38.9	22.3
1964–65	17.3	12.5	28.4	44.1	35.1	23.1
1965–66	17.3	12.7	26.6	45.8	36.0	23.2

### Women in the scientific staff of the SPM during the interwar period (1922–1940)

To this day, the history of Greek universities has dealt mainly with the work and activities of professors in their historical, social, and scientific context. This is so even though the university was “built” by many more, which is eminently true in the case of the physical sciences. Any action, even a single experiment, whether for research or teaching purposes, could never have been a one-person activity. It required the contribution of a number of people (scientists, technicians, and students) along its successive stages. This multi-person activity at the University had been developed on an “architectural plan” drawn up by chairholders, who were exclusively men, but implemented by many more, both men and women.<sup>15</sup>

During the interwar period, the University of Athens operated under two laws (2905/1922 and 5343/1932). They both made the same distinction as far as the teaching staff was concerned: they divided it into “senior” (ordinary professors, extraordinary professors, senior lecturers/*Privatdozenten*<sup>16</sup>) and “junior” faculty (laboratory supervisors, assistants, and preparers/technicians<sup>17</sup>). The second law, of 1932, offered more opportunities

<sup>15</sup>Panagiotis Kimourtzis, “Interpreting the Academic Progression of Marina Goudi,” in *Marina Goudi: Female Academic and Researcher*, ed. M. Psalidopoulos (Athens: Metamesonykties Ekdoseis, 2010), 49–59 [in Greek].

<sup>16</sup>The Greek academic rank of *yfigitis* (we call this “senior lecturer” in this paper) was inspired by the German *Privatdozent*. The Greek equivalent was introduced in the temporary regulations of the newly founded University of Athens (1837). Senior lecturers were not paid by either the University or the students. The University Act of 1932 permitted university Schools to assign one or more academic subjects to a senior lecturer; in this case, he would be called an “appointed senior lecturer” (*entetalmenos yfigitis*). Such lecturers were appointed for a three-year term of office, which could be renewed, following a decision by the School, twice more for three-year terms. Appointed senior lecturers received two-fifths of the salary of an ordinary professor.

<sup>17</sup>Most ordinary chairs of the SPM operated laboratories directed by the Chair Professor. Below the supervisor (*epimelitis*) in the laboratory personnel hierarchy, an assistant (*voithos*) could also be a student in the last two years of study, but the award of a degree was necessary for the initial term to be renewed. A preparer (*paraskevastis*), depending on the type of laboratory, could be either a graduate or an experienced technician. Laboratory staff were appointed and dismissed on the recommendation of the laboratory director.

for the expansion of the teaching staff, as indeed happened. However, more than a simple numerical enlargement, the general renewal that took place was notable, and was due in large part to the increase in the number of senior lecturers, who introduced new subjects, and to their gradual rise to the rank of professor.<sup>18</sup> This trend can also be observed among the senior faculty of the SPM, who, though kept at a steady number until 1932, gradually increased from then until the World War II (Table 4).

Despite this increase in teaching staff and its renewal in individuals, the participation of women in the senior staff of the SPM remained nil throughout the interwar period. After all, this was the context for the entire University of Athens from its inception until then, with only two exceptions: Angeliki Panagiotatou, and her habilitation in the School of Medicine in 1908, which could be regarded as a point of discontinuity since, for a long time, no other woman followed in her steps, and Sofia Gedeon's habilitation in the School of Philosophy in 1937. A significant breach in the make-up of the exclusively male teaching body occurred in the 1950s.<sup>19</sup>

The picture begins to change somewhat if we include in our observations the scientific staff employed in the laboratories, the tutorial rooms, and the museums of the SPM.<sup>20</sup> At the beginning of the period the junior teaching staff numbered just over 30 members and by its end their number had gradually increased to almost double (Table 5). This staff performed, at the educational and research level, work that was auxiliary in name but of major importance in substance, whose significance was already recognised at the time.<sup>21</sup>

The increased numbers of junior teaching staff provided more opportunities for women, graduates of the School, to contend for a position. During the interwar years there were 14 women in all, five or six per academic year, representing approximately 14% of the total staff for the first years of the period. The low percentage can be attributed to the fact that there had been academic years in which the female student presence was low, especially in three of the four departments of the School. However, such an explanation is incomplete. This is because, on the one hand, the low participation of women in the scientific staff was also evident in the fourth department (Pharmacy), which had a higher proportion of female students, and, on the other, because the gradual expansion of all the staff in the interwar period was not accompanied by a corresponding expansion of the number of female scientists. On the contrary, the entry of young women into the junior teaching staff was curbed towards the end of the period. One of the main reasons for this reversal may have been the diversification of the social origins of the female students which had started at the beginning of the period. The female students of the late interwar period came from lower socio-economic backgrounds in comparison with those of previous years and had less freedom to shape their professional future. They were subject to greater pressures imposed either by their needs to earn their livelihood or

<sup>18</sup>See note 4 above.

<sup>19</sup>St Vosniadou and L. Laiou, "The Status of Women in the Scientific Staff of the University of Athens," in *4<sup>th</sup> International Scientific Conference in History of Education: History of University Education* (University of Patra, Patra, 2006) [in Greek]. One of the first assessments about the position of women in the Greek university: Maria Iliou, "Women Professors: Evolution of Their Position or Stagnation?" *Epitheorisi Koinonikon Erevnon* 70 (1988): 3–24 [in Greek].

<sup>20</sup>The 1922 Law assigned to the SPM 11 laboratories, 2 tutorial rooms, 4 museums, and the Botanical Garden. By the end of the interwar period the number of laboratories had increased to 19.

<sup>21</sup>Historical Archive of the National and Kapodistrian University of Athens (hereinafter "NKUA-HA"), Rector's Report by K. Zenghelis, 1924–1925, p. 4. According to the Rector, Professor of Inorganic Chemistry, "... of the laboratory supervisors and clinic registrars, whom the new regulation has most certainly elevated, most have taught regularly without any such express obligation, thus filling in many teaching gaps, before crowded audiences".



**Table 4.** Senior teaching staff of the School of Physics and Mathematics.

	Ordinary professors	Extraordinary professors	Senior lecturers	Total
1923–24	16	1	0	17
1924–25	15	2	0	17
1925–26	15	2	0	17
1926–27	15	2	0	17
1927–28	15	2	0	17
1928–29	14	2	0	16
1929–30	14	3	0	17
1930–31	14	3	0	17
1931–32	15	4	0	19
1932–33	15	5	2	22
1933–34	15	5	3	23
1934–35	15	7	3	25
1935–36	15	6	5	26
1936–37	16	6	6	28
1937–38	19	2	10	31
1938–39	13	2	18	33
1939–40	21	6	9	36
1948–49	20	3	13	36
1949–50	19	8	7	34
1950–51	19	10	7	36
1951–52	19	6	13	38
1952–53	18	13	9	40
1953–54	19	12	11	42
1954–55	19	9	12	40
1955–56	19	8	14	41
1956–57	19	4	14	37
1957–58	18	3	15	36
1958–59	16	4	17	37
1959–60	19	3	16	38
1960–61	20	3	18	41
1961–62	20	4	16	40
1962–63	20	5	17	42
1963–64	21	5	18	44
1964–65	21	5	19	45
1965–66	20	4	26	50
1967–68	19	6	27	52

The data in and come from the corresponding Year Books of the University of Athens. Year Books were not published for the years 1940–1948.

their social “heritage”. Consequently, the choice of a job that salary-wise was less attractive and scientifically more demanding than other career paths available to university graduates was an unacceptable “luxury” for them.

The 14 women in the laboratory staff of that period did not last long in their university positions. Specifically, nine worked for between three and seven years, and five worked for more than ten years (only three for more than twenty). All but one were assistants and preparers. The nine that worked for between three and seven years, although five assistants received doctoral degrees, which enabled them to become laboratory supervisors.<sup>22</sup> However, this was the case only with one of the five women with doctoral studies, while none of the preparers submitted a thesis and none advanced further. They were dispersed over seven different Chairs, and the assistants who received doctorates

<sup>22</sup>Initially the doctoral degree awarded by the University signified the distinguished completion of the four-year course of study. The distinction between a bachelor's degree and a doctoral degree was made in 1911, so doctors as holders of postgraduate degrees came after that year. During the period 1922–1940 the School awarded seven doctoral degrees to women out of a total of 81. Five of the seven women worked as members of the scientific staff of the School, the sixth worked as an assistant in the School of Medicine. The seventh title was awarded shortly before the breakout of the War, and its holder followed a different career path.

**Table 5.** Junior teaching staff of the School of Physics and Mathematics.

	Supervisors		Assistants		Preparers		Total staff	
	Total	Women	Total	Women	Total	Women	Total	Women
1923–24	6	0	16	4	10	1	32	5
1924–25	6	0	18	3	10	2	34	5
1925–26	13	1	19	3	12	2	44	6
1926–27	14	1	17	3	12	2	43	6
1927–28	16	1	14	3	12	2	42	6
1928–29	15	1	16	4	12	1	43	6
1929–30	16	1	14	4	10	1	40	6
1930–31	16	1	18	4	12	1	46	6
1931–32	17	1	19	4	11	1	47	6
1932–33	16	1	18	2	13	1	47	4
1933–34	15	0	21	3	15	2	51	5
1934–35	15	0	26	3	15	2	56	5
1935–36	16	0	26	2	14	3	56	5
1936–37	14	0	24	2	14	3	52	5
1937–38	17	1*	20	3	17	3	54	7
1938–39	14	1*	27	2	17	3	58	6
1939–40	9	1*	20	1	17	3	46	5
1948–49	10	0	20	4	18	5	48	9
1949–50	8	0	18	3	18	4	44	7
1950–51	10	1	16	3	17	4	43	7
1951–52	13	1	16	3	18	5	47	9
1952–53	12	1	15	3	18	5	45	9
1953–54	9	1	16	3	17	5	42	9
1954–55	11	1	16	3	17	5	44	9
1955–56	11	1	29	6	17	5	57	12
1956–57	11	1	28	6	17	5	56	12
1957–58	13	3	25	6	21	5	59	14
1958–59	12	3	24	6	21	5	57	14
1959–60	14	2	27	11	21	5	62	18
1960–61	15	2	32	13	17	4	64	19
1961–62	16	2	37	15	19	4	72	21
1962–63	15	3	39	14	20	6	74	23
1963–64	13	2	48	15	22	6	83	23
1964–65	19	3*	65	15	24	7	108	25
1965–66	16	2*	85	18	23	9	124	29
1967–68	16	5**	96	19	22	7	134	31

The numbers for members of the junior teaching staff in do not include members of the senior teaching staff (senior lecturers, for the most part) who simultaneously held the post of laboratory supervisor (included in). A single \* denotes the presence of one temporary supervisor and \*\* the presence of two.

among three Chairs (Physics, Inorganic Chemistry, Mathematics), which we examine in more detail below.

Anastasia Anargyrou began her career in 1923 as assistant in the Inorganic Chemistry Laboratory of Professor Konstantinos Zenghelis and two years later became supervisor. Anastasia Anargyrou was born in the Greek community of Trieste and her father I. Anargyrou was professor of Mathematics at the Hellenic Army Academy. She was a student in the Physics Department but transferred to the Chemistry Department when it was founded in 1918 and received her degree in 1921. At first, she worked as an assistant for two academic years. In 1925 she submitted a doctoral thesis titled “Study on colloidal manganese oxide”, which was graded as “excellent”.<sup>23</sup> Immediately afterwards she was appointed as supervisor of the laboratory, where she remained until the academic year of 1932/3. She was the only woman in the SPM who had been appointed

<sup>23</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 7.2.1925 and 14.2.1925.

as laboratory supervisor during the interwar period in comparison with 14–17 male laboratory supervisors.<sup>24</sup> Anargyrou appears to have been primarily in charge of supporting the Chair professor's teaching and research work, a task that kept her in obscurity (apart from her doctoral thesis, we did not find any other publications, whether independent or participatory). Also, there is no evidence that she took over teaching duties as did her male co-supervisor in the laboratory. Among the few things we know about Anargyrou is her image as conveyed by her fellow student and then laboratory colleague I. Kandilis: "Zenghelis [...] would work only with his special assistant, Miss Anastasia Anargyrou [...] we did not see much of her and thought she too snubbed us. A girl of impressive beauty, from a reputable family, always busy with her Professor, she was with him in a world of their own, a terra incognita to most others".<sup>25</sup> In the text, which is an attempt at a flattering biography of K. Zenghelis, the matter of the professor's affability or lack thereof is approached via A. Anargyrou. Anargyrou herself is not assessed for her scientific competence or for the manner in which she performed her duties. Her role is perceived as that of a "private assistant" while even that is concealed under descriptions of her "impressive" beauty and "reputable" descent. Her term as laboratory supervisor was renewed only once by the School.<sup>26</sup> As a matter of fact, her progress may have been slowed down by social constraints but it was more so by the tuberculosis that struck her, a problem that plagued the country until even after World War II.<sup>27</sup> She eventually recovered, but even so she had to quit her job after ten years in the position.

In the same laboratory as A. Anargyrou and for an overlapping period, Aikaterini Stathi worked as an assistant, remaining in the position from 1928 to 1949. Aikaterini, the daughter of painter and art dealer Cosmas Stathis, received her degree in Chemistry in 1927 and was subsequently appointed as laboratory assistant. Her older brother, Eleftherios Stathis, had been working there since 1923. He later became supervisor of the laboratory and in 1949 professor of Inorganic Chemistry. Aikaterini received her doctorate 11 years after her bachelor's degree, in 1938, with a thesis on "Hydrogenation catalysed by colloidal rhodium", which was, like A. Anargyrou's thesis, in the research area covered by the work of Chair Professor K. Zenghelis. Aikaterini Stathi is the only female scientist of the time whose work in the laboratory was recorded in several publications and conference papers. She had a number of such publications before and especially after receiving her doctorate, in collaboration with the professors/directors of the laboratory (K. Zenghelis and his successor T. Karantasis). She also authored a university textbook. Therefore, we can say that she was the first one to cross the symbolic barrier and make visible the contribution of female assistants to the research and teaching work of laboratories. She resigned when her brother was elected professor and, subsequently, supported the work of physics professor Michael Anastasiadis whom she had married a few years earlier.

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<sup>24</sup>For a short time, at the end of the interwar period, Maria Vlissidou, a laboratory assistant, was appointed as temporary supervisor in the Physical Geography Laboratory. She was the daughter of Th. Vlissidis, a former professor at the University of Thessaloniki and then secretary general of the Ministry of Education in the dictatorial government of Ioannis Metaxas.

<sup>25</sup>Kandilis, *The Founders of Physical Sciences*, 22.

<sup>26</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 17.10.1930.

<sup>27</sup>Vasso Theodorou, "Doctors' Attitude Towards the Social Issue. The Struggle Against Tuberculosis in the Early 20th Century, 1901–1926," *Mnimon* 24, no. 2 (2002): 145–78[in Greek].

Maria Marketou worked for six years as assistant in Professor Dimitrios Hondros's Physics Laboratory. She was still a student when she started working there in 1923. She received her degree in 1925 and her doctorate in 1928 with a doctoral thesis titled "On the distribution of brightness over a clear sky".<sup>28</sup> The following year, she left the University of Athens and went to the newly founded University of Thessaloniki, where she was appointed as supervisor and was immediately given the opportunity to pursue her education abroad. She returned to Thessaloniki in 1935 and was elected senior lecturer in 1939 and extraordinary professor in 1947.<sup>29</sup> In the same year she married the professor of Mathematics at the same University, Othon Pylarinos; they had a common origin from Kefalonia, had studied together at the University of Athens, received their doctoral degrees at the same time, and moved to Thessaloniki together. Maria Marketou was the first professor of Physics in a Greek university and the only woman until the end of the period under consideration to have served as the dean of a School of Science. The Marketou-Pylarinos couple were for many years one of the few, if not the only, married couple of professors in a Greek university. Marketou's academic career is worth further investigation.

As for mathematics, there were few scientific posts until 1932. This changed with the law of 1932, but there few mathematics assistants of either sex until World War II. Two women served in this position, the first one at the beginning of the period and the second at its end. Both holders of doctoral degrees remained in the SPM for six years each.

Sophia Müller, daughter of a landowner from the Peloponnese, was initially hired as a librarian at the Mathematics Tutorial Room. She received her PhD degree in 1924 with a thesis titled "The Weierstrass theorem in algebroid functions" directed by Professor G. Remoundos and soon afterwards she was appointed as assistant.<sup>30</sup> In 1928 she married Aristotle Oikonomou, with whom she had worked in the Mathematics Tutorial Room, and had a daughter. He had already been elected professor at the Technical University. She retained her post until 1930, as a second term of office was not possible for assistants of the Mathematics Tutorial Room. Sophia Müller and Maria Marketou were also active in the public sphere as, in 1928, they were elected to the Board of Directors of the Association of Greek Women Scientists, which then numbered 140 members.<sup>31</sup> Their activity, in addition to their contribution to the women's movement of the time, also made women's presence in the fields of science and mathematics visible in the public sphere.

The second female assistant in Mathematics was Penelope Kakridi, a member of a family with a long scientific and academic tradition. Her father was Theofanis Kakridis, Professor of Latin Literature at the University of Athens. On her mother's side her grandfather was Ioannis Hatzidakis and her uncle was Nikolaos Hatzidakis, both of them professors of Mathematics at the SPM (appointed in 1884 and 1904 respectively). Her two brothers also had an academic career: one was Professor of Classical Philology

<sup>28</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 23.3.1928, 4.5.1928 and 18.5.1928.

<sup>29</sup>Papadimitraki-Chichlia, "Maria Marketou-Pylarinou," *Nea Estia*, no. 1511 (1990): 819–20; K. Poulakos, "Othon P. Pylarinos," *Nea Estia*, no. 1522 (1990): 1644–5; Department of Physics, Aristotle University of Thessaloniki, "From the History of the Physics Department," *Phenomenon*, no. D.4 (2008): 2–7.

<sup>30</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 10.11.1923, 24.11.1923, 26.1.1924 and 9.2.1924.

<sup>31</sup>"Women's Struggle," *Epikaira*, no. 70 (1928).

Ioannis Kakridis, who taught, *inter alia*, at the Universities of Athens and Thessaloniki, and the other was George Kakridis, Professor at the Technical University. Penelope enrolled in the Mathematics Department in 1926 but did not attend classes. She went to Munich and attended the University there for three years. She returned to Athens in 1929 and applied to be enrolled as a fourth-year student, a right granted to her after examinations.<sup>32</sup> She received her degree in 1930 and in 1931 she was appointed first as a temporary assistant at the Mathematics Tutorial Room and then, taking advantage of a new law for the appointment of assistants to professors' chairs, as assistant to the Chair of Mathematical Analysis, held at the time by her uncle, Nikolaos Hatzidakis. In 1935 she submitted her doctoral dissertation, directed by Professor P. Zervos, which was approved by the School with a grade of "Excellent", and received a cash prize.<sup>33</sup> She published her work in 1937 with two articles in the journal *Mathematische Annalen*.<sup>34</sup> One year after Nikolaos Hatzidakis's retirement, she resigned from the position of assistant. Meanwhile, in 1935 she had married Professor of Philosophy at the University of Athens Ioannis Theodorakopoulos, with whom she had three children.

We do not know the reasons behind Penelope Kakridi's decision to end her academic career. What we know, however, is how her decision was recorded on a social level, several years later. Panagiotis Kanellopoulos,<sup>35</sup> a personal friend of Penelope and her husband, in his eulogy to her in 1957 noted:

In the way that her two brothers have distinguished themselves . . . Penelope too would have made a name for herself in the world of science – her first original contributions to mathematical problems were a guarantee of that – had she not decided to exchange her independent scientific mission with another, which is so much more important to a woman. Penelope became a wife and a mother.<sup>36</sup>

The evident identification, contained in the above words, of the female gender with a proclivity for marriage and family highlights the mainstream thinking of the time, even among the intellectual: men and women are governed by different moral and social priorities. It was a conviction that predetermined the different spheres of activity of the two sexes in society. More than that, however, as it took women's domestic roles away from the commonplace and interpreted them as a social destination and a moral standard, it secured a rational, positive sign to the socially constructed destination for women. In doing so, it also offered a stronger ideological legitimacy to this destination.<sup>37</sup>

To sum up, we can see that the interwar period in Greece was the time when the first female scientists attempted to gain access to the world of academia and, especially for the

<sup>32</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 30.11.1928.

<sup>33</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 29.3.1935, 31.5.1935 and 14.6.1935.

<sup>34</sup>*Mathematische Annalen*, no. 113.1 (1937): 657–64; *Mathematische Annalen*, no. 114.1 (1937): 275–83.

<sup>35</sup>P. Kanellopoulos (1902–1986) was a politician, philosopher, and the first professor of sociology at a Greek university. In 1957, the year of our reference, he had already served as Prime Minister for a brief period (1945). On his mother's side, he came from an important political family. He studied law at the University of Athens and the University of Heidelberg and was awarded a doctorate in Law at Heidelberg and in Philosophy at the University of Munich. Ideologically, he was a leading exponent of modern Greek liberalism trying to reconcile the liberal social model with socialist principles such as social justice and state interventionism.

<sup>36</sup>Gennadius Library-Vovolinis Archive, *Kathimerini*, 6.10.1957. Similarly, in another obituary, her personality was outlined in words which defined the characteristics (and therefore the functions) of the two sexes as fundamentally different: "Her bright intellect, her tender feelings, and her feminine intuition were intertwined in a precious amalgam with her husband's wisdom": P. Michalis, *To Vima*, 6.10.1957.

<sup>37</sup>Helen Fournaraki, "Why Should Women Be Deprived of the Vote? Universal Male Suffrage and Exclusion of Women from Politics in 19th-Century Greece," *Mnimon*, no. 24 (2002): 179–226 [in Greek].

purposes of this paper, to pursue a career at the University of Athens. Their presence remained localised in a few scientific fields. In the laboratories they started from low positions and few of them pursued a doctorate. When they earned one, it was not enough to earn them a career in the specific University. In most cases, it hardly even supported their brief presence at the University. The presence of male scientists in the parental or marital family was common and had a positive effect, but this was mainly at the beginning of the women's career. What followed seems to have been defined by the characteristics of the particular discipline as well as the social predetermination of female roles.

All the same, this was the period when the first women scientists acquired a presence, though small, in the realm of science in academia. Even though for most of them their limited academic future had been determined since their appointment,<sup>38</sup> they were there day after day, at the laboratory benches and inside their classrooms, and contributed to what their lab produced. Whether through rationales of exclusion or through processes of integration, their activity was an integral part in the formation of the particular scientific community. At the end of the period a female student joined the Organic Chemistry laboratory in order to offer her services without pay. The female scientist who was to become the first member of the senior teaching staff of the SPM of the University of Athens had made her appearance.

### Female scientists in the SPM: from the end of the World War II until 1967

During the period 1948 to 1967, the expansion of the teaching staff of the SPM, both junior and senior, continued (Tables 4 and 5). Senior staff increased – mainly extraordinary professors and senior lecturers. Their presence, on the one hand, helped meet the multiple teaching requirements created by the growing number of students, and, on the other hand, helped introduce new fields of knowledge into the School. The expansion of the junior scientific staff was also important. By the end of the period, the number of laboratories had increased, and their staff had almost trebled through new positions in laboratories and chairs.

At the same time, the presence of female scientists began to acquire different quantitative and qualitative characteristics in comparison with those of the previous period. Women were increasing in number and percentage in all three positions (supervisors, assistants, and preparers). Their entry took place at a steady rate, women were to be found in every new academic year, and their evolution in the teaching staff of the SPM had begun. In fact, after 1958, the first female scientists started joining the School's senior teaching staff.

We have identified 43 women participating in the laboratory staff of the SPM during the period 1948 to 1967. Eleven of them had started as preparers and the rest as assistants, this time well distributed over most scientific fields. However, there were exceptions: the mathematics chairs had only one female assistant, in the last two years of the period, although they had 25 assistants in all in the last five years. Also, the laboratories of

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<sup>38</sup>Maria Iliou, "Women Academics: Evolution of Their Status or Stagnation?" in *Education and Gender. Historical Dimension and Contemporary Contemplation*, ed. V. Deligiannis, S. Ziogou (Thessaloniki: Vaniias, 1999), 417–44 [in Greek].

Astronomy, Seismology, Meteorology, and Electronic Physics continued without the participation of female scientists.

Length of service as junior scientific staff increased, with only a few women interrupting their work after a period of a few years. This was due to their more frequent career advancements: six became supervisors in their laboratories and three became temporary supervisors. Of these nine, two had started as preparers. Finally, 16 out of the 43 female scientists of that period became senior faculty during their careers, 10 of them before the legislative framework was changed in 1982. Four crossed the threshold and joined the senior teaching staff of the SPM during the period under consideration, that is, by 1967, and the remainder followed later.

The first entry was made when Irene Papadimitriou-Dilari was promoted to the post of senior lecturer (Privatdozent) in Organic Chemistry in 1958.<sup>39</sup> Three more followed: Paraskevi Euthymiou in Physics in 1963,<sup>40</sup> Eleftheria Davi in Geology-Palaeontology in 1965,<sup>41</sup> and Iphigenia Vourvidou-Photaki also in Organic Chemistry in 1965.<sup>42</sup> These first senior lecturers came from the School's student body. They had all studied in its departments, obtained their doctoral degrees from the School, and worked in its laboratories as students. Until the end of the period, the School had not considered applications from female scientists to be employed as teaching staff unless they had had a long stint at the School's laboratory.<sup>43</sup> It seems that a prerequisite was the long-term evidence of their worth and contribution to the School, a prerequisite which had de facto been overcome in the same period when it came to the submission of applications by male scientists.<sup>44</sup>

All four worked alongside professors who held a dominant position in the SPM and in academic life in general. Eleftheria Davi worked alongside Maximos Mitsopoulos of Geology-Palaeontology, Paraskevi Euthymiou alongside Caesar Alexopoulos of Physics, and two chemists, Irene Papadimitriou-Dilari and Iphigenia Vourvidou-Photaki worked alongside the internationally renowned Professor of Organic Chemistry, Leonidas Zervas. By the end of the period under consideration, all four women were given the title of appointed senior lecturer, which means that they gained autonomy in their teaching.

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<sup>39</sup>Her doctoral thesis (1948) was titled "Contribution to the Chemistry of the Peptide Bond" and her habilitation thesis (1958) "Organic Phosphorus Compounds".

<sup>40</sup>Her doctoral thesis (1952) was titled "Investigating the Characteristic Temperature of Platinum from X-ray Reflections" and her habilitation thesis (1965) "Influence of b-rays on Magnetoresistance and Carrier Mobility of Indium Antimonide".

<sup>41</sup>The subject of her doctoral thesis at the University of Athens (1950) was "The South Euboea Blueschists" and at ETH Zurich (1955) "Die jungvulkanischen Gesteine von Aegina, Methana und Poros und der Stellung im Rahmen der Kykladenprovinz". Her thesis at the Technical University of Athens (1959) was titled "The Volcanic Rocks of Lemnos Island" and at the University of Athens (1965) "Geological Formation of the Island of Samothrace".

<sup>42</sup>Her doctoral thesis (1950) was titled "Glucosamine Research" and her habilitation thesis (1965) "On Oxytocin".

<sup>43</sup>During the same period a habilitation thesis in mathematics by Ioanna Ferentinou-Nikolakopoulou, who did not belong to the teaching staff of the SPM, was submitted for examination. After delays in deciding which professor would be designated as director, her thesis was not discussed after all (NKUA-HA, Proceedings of the Meetings of the SPM, 10.12.1965, 17.12.1965 and 25.2.1965).

<sup>44</sup>About half of the male scientists whose theses were discussed in the period 1948–1967 either had no teaching history with the School or had a limited one of less than five years.

## The progression of the first four senior lecturers of the SPM

In what follows we attempt to reconstruct the path of the four scientists to habilitation. We examine the paths they followed in parallel and focus on the key points along their journey. Such focus serves a dual purpose. It allows, on the one hand, to gather evidence that is solid proof of their membership in the academic community of Greek physical sciences and, on the other hand, allows for comparisons between different fields of science.

With the exception of Irene Papadimitriou-Dilari, who received her degree in 1940, Greece's entry into World War II found the other three female scientists still in University, which resulted in their completing their studies two or three years after the end of the war. They all started working in the School's laboratories when they were still students, in their third or fourth year. This was not uncommon among the School's laboratories. However, the needs of the laboratories were often covered by the unpaid services of volunteer students rather than by appointment. In everyday language, positions of this type, not provided for by law, were referred to with the special and quite descriptive name "sub-assistants". This is a three-dimensional phenomenon: it is indicative of the highly hierarchical relations in the organisation of the University under the institution of the Chair, and it also shows, on the one hand, the weak capacity of the State to support the development of research in a timely and effective manner and, on the other hand, the excessive zeal that every young scientist had to show in order to flourish in the restricted and restrictive Greek academic and research universe.

Iphigenia Vourvidou-Photaki started working as a salaried assistant in the Mechanical Engineering Laboratory when she was still a third-year student. She was the only salaried assistant; the other three started out as unsalaried ones: Paraskevi Euthymiou worked for a year as a fourth-year student, Irene Papadimitriou-Dilari for the last two years of her studies, and Eleftheria Davi for almost six years, four of them after graduation.<sup>45</sup> For the last of them, although she had been offered appointment to a vacant post, it "fell through for lack of adequate funds".<sup>46</sup> However, when it eventually materialised, it was a preparer's post.

All earned their doctorates with a grade of "excellent". E. Davi and I. Vourvidou-Photaki received theirs four years after their degree and P. Euthymiou five years later. For E. Papadimitriou-Dilari, who had preceded the other three, the corresponding period was eight years, as she had graduated in the same year that the country entered the War. The Organic Chemistry Laboratory was commandeered by occupation troops and was financially drained. The abolition of entrance examinations in the Department of Chemistry during the first years of the Occupation also swelled the number of enrolled students, making it impossible for them to practise in the laboratories. The Director of the Organic Chemistry Laboratory, Professor Leonidas Zervas, was twice arrested by the German occupation army and jailed.<sup>47</sup> The events had the effect of halting the research work of the laboratory while a great deal of effort was required even for its basic

<sup>45</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 15.1.1977; *Curriculum Vitae and Scientific Work of Iphigenia Vourvidou-Photak* (Athens 1968); *Report of habilitation candidate Paraskevi K. Euthymiou* (Athens 1963).

<sup>46</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 15.6.1950 and 15.6.1964.

<sup>47</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 9.2.1943 and 29.7.1944; Komninos Pyromaglou, *The Trojan Horse: Political and National Crisis During the Occupation* (Athens: Dodoni, 2013), 154 [in Greek]. Leonidas Zervas was a member of the EDES resistance group and its spokesman for the Athens section.



educational function. E. Papadimitriou-Dilari played a decisive role in its smooth operation, as she took on a heavy workload, which was recognised at a later time by the entire staff of the School.<sup>48</sup>

For all four women the time elapsed between their doctoral thesis and habilitation ranged from 10 to 15 years. In the interim, the academic career of each woman developed differently. Three of the four continued to serve in the respective laboratories of the School. The fourth, I. Vourvidou-Photaki, retired from her position of assistant four years after receiving her doctorate and, until habilitation, devoted her time to advancing her research work.

The first woman to become senior lecturer, E. Papadimitriou-Dilari, held the post of supervisor in the Organic Chemistry Laboratory for almost the entire period from her doctoral to her habilitation thesis. She was responsible for the laboratory training of the students and supported young researchers in the preparation of their doctoral research. Her personal research work was largely carried out in Greece, but for short periods of time she also went to universities or research institutes in England and Scotland for further education and research.<sup>49</sup>

At about the same time, P. Euthymiou attended the newly established postgraduate programme in Electronic Physics (Radioelectrology), from which she received the corresponding diploma in 1953. With scholarships from Greek and foreign establishments, she received further training at the University of Illinois, USA, and the University of Reading, England, for intermittent periods of approximately two years. For nearly half of this time, she was also a supervisor at the Physics Laboratory, where she was responsible for the training of almost all SPM students and, at the same time, for the experimental further training of secondary school physics teachers.<sup>50</sup>

For E. Davi it was a period of 15 years from her doctoral to her habilitation thesis. After initially undergoing six years of unpaid work until her doctorate, she remained for another seven years as a preparer at the Museum of Mineralogy and Petrography before becoming a supervisor at the Geology and Palaeontology Laboratory. During that 15-year period she distinguished herself in state scholarship contests and went on to receive further training at ETH Zurich and the Universities of Geneva and Basel for three years. She received a second doctorate from ETH Zurich under the supervision of Professor Conrad Burri, and she also visited these institutions during the next summers to do research there. At the same time, apart from the SPM, she also taught at the Technical University of Athens, where she was elected as a senior lecturer six years before her habilitation at the SPM.<sup>51</sup>

For I. Vourvidou-Photaki the same amount of time was, for the most part, free from the burden of teaching. She was educated at the University of Basel in the laboratory of Tadeusz Reichstein (Nobel Prize in Physiology and Medicine, 1950). Her collaboration there with professors Max Brenner and Hans Erlenmeyer led to joint publications in scientific journals and conferences, while she worked as a research associate in the latter's laboratory. She returned to Greece three years later. Initially she worked in the

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<sup>48</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 15.1.1977 and 20.1.1977.

<sup>49</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 15.1.1977.

<sup>50</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 22.3.1957 and 3.5.1963; *Report of habilitation candidate Paraskevi K. Euthymiou* (Athens, 1963).

<sup>51</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 22.1.1957; *Curriculum Vitae of E. Davi* (Athens, 1994).

biochemical laboratory of a large Athens hospital and later was employed as a researcher at the Royal Research Foundation (RRF).<sup>52</sup> The RRF had just been established as a result of the initiative of Ioannis Pesmazoglou, K. Th. Dimaras and Leonidas Zervas, mentor of I. Vourvidou-Photaki. Its foundation was motivated by the fact that “the organisation and activities both of public services and of higher education institutions [were] built on older foundations and principles and [were] not always oriented in a sufficiently forward-looking direction”. This was accompanied by the expectation to help the advancement of scientists with a strong academic background and interest in research, which “could reasonably be expected to materially affect the orientation and activities of existing educational and scientific foundations”.<sup>53</sup> The RRF financed the research of I. Vourvidou-Photaki since her profile matched the requirements set by its goals, while she too appears to have found in RRF the flexibility she sought in order to carry on her research work. In 1962 she was selected by an international team of researchers and invited to work with Professor Vincent Du Vigneaud (Chemistry Nobel, 1955) at Cornell University, New York. She stayed there for one academic year and returned to Greece with a warm letter signed by Du Vigneaud, with whom she maintained her collaboration. At the same time, she received funding from the US National Institute of Health, which she passed on to the budget of the Organic Chemistry Laboratory, where she returned to work as a guest for two years until her habilitation.<sup>54</sup>

Only seven years separate the first from the fourth habilitation. This may be a short time, but an increasing degree of extroversion in the scientific work of the four female scientists being considered here is already evident. Eleftheria Davi and Iphigenia Vourvidou-Photaki continued their research work and progressed along their overall career path from doctoral thesis to habilitation over a longer period but with a greater degree of independence from the SPM. They collaborated with more educational institutions abroad and for longer periods of time, while pursuing collaborations with other scientific organisations in Greece. As a result, until their habilitation they had accumulated more training and titles and a larger body of scientific work. On the other hand, Irene Papadimitriou-Dilari and Paraskevi Euthymiou, with significant differences in their career paths and personalities, shared a similarity that concerned their relationship with the University – both were responsible for a long time for two key SPM laboratories which attracted large numbers of students, doctoral candidates, and teaching staff. They were more focused within the SPM, and therefore their research work was more in line with the School itself.

When the habilitation theses of the four female scientists were reviewed, they were directed by the professors next to whom they worked. They all submitted glowing reports for all four candidates.<sup>55</sup> For three of them, the School decided unanimously in favour of their election, while in regards to Paraskevi Euthymiou there was a long debate, initiated by Professor of Electronic Physics M. Anastasiadis, concerning the candidate’s scientific credentials and, in essence, the guidance by K. Alexopoulos and his corresponding manipulations.<sup>56</sup>

<sup>52</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 15.1.1977; *Curriculum Vitae and Scientific Work of Iphigenia Vourvidou-Photaki* (Athens, 1968).

<sup>53</sup>Triantaphyllos Sklavenitis, *The Founding Texts of the National Research Foundation and the Correspondence between I. St. Pesmazoglou and L. Th. Zervas* (Athens: NRF, 2008), 44, 46 [in Greek].

<sup>54</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 19.2.1965; *Curriculum Vitae and Scientific Work of Iphigenia Vourvidou-Photaki* (Athens, 1968).

<sup>55</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 31.1.1958, 3.5.1963, 13.11.1965, and 19.3.1965.

<sup>56</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 3.5.1963 and 14.6.1963.

Habilitation for all four female scientists took place when they were about 40. As far as their personal lives are concerned, two of them were married but neither had children. Issues relating to making one's way in the physical sciences and building a university career as opposed to personal life choices were important in this case too.<sup>57</sup> Work "from eight in the morning to ten in the evening", a leitmotif in professors' discussions in the procedure for the approval of their habilitations was certainly an interesting element, as such references do not exist in corresponding reviews of male candidates. Women had to be asked whether they could cope with what was thought to be natural for men. The distortion is evident.

Nine years after her habilitation, Irene Papadimitriou-Dilari, and two years after theirs the other three female scientists, became appointed senior lecturers. The appointment of a senior lecturer as *entetalmenos* was, almost always, a subject of extensive debate. This was because it was a title enabling the lecturer to teach compulsory lessons autonomously. After all, it was a paid position, in contrast to that of the plain *ifigitis* (senior lecturer). Most of all, however, it was a position in which the total number of appointed senior lecturers was subject to restrictive arrangements that were uniform across the School. It therefore attracted the interest of chairholders because, *inter alia*, it concerned the future development and facilitation of the work of their own Chair. This is one more point which highlights the strong relationship with the course and the choices of professors/mentors which seems to determine the evolution of scientific successors.

Eleftheria Davi's application for the post of appointed senior lecturer was submitted by the new, temporary, professor of the Chair, who already had another chair of his own. The relevant discussion at the School turned into a debate about the redistribution of power among professors. Although they did not question but instead praised Davi's scientific presence, the School did not vote unanimously on this specific appointment.<sup>58</sup> For the other three senior lecturers, the two professors handled the issue of their appointment in a different manner. Alexopoulos kept Euthymiou in the position of laboratory supervisor even after the assignment of the post of appointed senior lecturer. His choice faced the reactions and reservations of the other professors.<sup>59</sup> On inviting the two female chemists to become appointed senior lecturers, L. Zervas said that he considered the holding of both positions as contrary to the law because it restricted the School's ability to increase its staff and promote new members. The School decided that "although lawful, it is preferable that the two posts not be covered by the same person"; as a result, Irene Papadimitriou-Dilari pledged to resign as supervisor.<sup>60</sup> The decision to assign the teaching of courses to the two female senior lecturers of Organic Chemistry was taken on 31 March 1967. The timing made it necessary to confirm the decision at a subsequent meeting of the School<sup>61</sup> as the 21 April coup took place a month later. But now everything was different: the dictatorship ordered the dismissal of Irene Papadimitriou-Dilari from the University of Athens and declined, through the Minister of Education, to approve the assignment of Iphigenia Vourvidou-Photaki.<sup>62</sup> Not only did political developments prevent all the female candidates from taking

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<sup>57</sup>Schiebinger, *Has Feminism Changed Science?*, 92–103.

<sup>58</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 20.10.1967.

<sup>59</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 22.10.1965 and 26.11.1965.

<sup>60</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 17.3.1967 and 31.3.1967.

<sup>61</sup>NKUA-HA, Proceedings of the Meetings of the SPM, 12.5.1967.

<sup>62</sup>*Appendix of the University of Athens Year Book, 1967–1968; Supplement to the Curriculum Vitae and Scientific Work of Iphigenia Vourvidou-Photaki* (Athens, 1976).

advantage of the hard-won privilege, but they also imposed new dilemmas on university professors, which the four female senior lecturers dealt with in different ways.

The post of appointed senior lecturer was the last stop for these four female scientists in the period examined. Their scientific career was completed for three of them at the School of Physics and Mathematics and for Eleftheria Davi at the Agricultural University of Athens.<sup>63</sup> Therefore, charting the full trajectory of the first four female senior lecturers of the SPM is still to be completed, further enriched with details from the life and operation of their laboratories.

The initial data from the study of their progression, as well as that of all female scientists in the same period, already provide us with insights and useful refinements to form the profiles of the individual disciplines in the SPM. The often-repeated observation (which is also true in the case of Greek universities) that “women are so few” in the physical sciences, now needs to give its place to questions about how these scientists “built” their space in their scientific communities.<sup>64</sup> The more general and productive question “Why do we know so few things about them today?” broadens the search for answers.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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Irene Papadimitriou-Dilari (1918, Velventos, Kozani–2008, Athens), after her dismissal in 1967, worked in industry until her return to the University in 1974. In 1975 she was appointed as extraordinary professor. She contested the chair of Organic Chemistry in 1977 (where Iphigenia Vourvidou-Photaki was eventually elected) and also made attempts at election at the Technical University and the University of Patras. She served as president of the Association of Greek Chemists (1975–1979) and the Association of Greek Women Scientists (1985–1989).

Paraskevi Euthymiou (1923, Athens–2013, Athens) became an extraordinary professor in 1972 and in 1974 was elected as associate professor at the 2nd Physics Chair and then as ordinary professor. She remained in that position until she retired.

Eleftheria Davi (1923, Rethymnon, Crete) was elected as extraordinary professor in 1969 at the Agricultural University of Athens, was nominated as ordinary professor in 1970 and appointed in 1974. In 1976 she was a candidate for the Chair of Geology-Palaeontology at the SPM (but was not elected). She retired as professor emerita of the Agricultural University in 1990.

<sup>63</sup>Iphigenia Vourvidou-Photaki (1921, Corinth–1983, Athens) temporarily served as the head of the Organic Chemistry Laboratory for the years 1973–1975 and in 1975 was appointed as extraordinary professor. In 1977 she contested the vacant chair with four co-candidates, among whom was Irene Papadimitriou-Dilari, and was elected as ordinary professor. She held the position until her death.

<sup>64</sup>Paula Gould, “Making Space for Women in the History of Physics,” *Endeavour* 22, no. 1 (1998): 24–6.

Sciences at the University of Athens in the early 20th century. Her research covers topics such as the political and social context within which the scientific endeavour evolved; the relationships and the hierarchical structures among the teaching staff; the shaping of professional practices at the laboratories of the University.

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