

# SUCCESSFUL GRANT-WRITING STRATEGIES FOR JUNIOR SCIENTISTS: AN AMERICAN PUBLIC UNIVERSITY PERSPECTIVE

## STRATEGIE PISANIA PODAŃ O DOTACJE BADAŃ DLA MŁODYCH PRACOWNIKÓW NAUKI: Z PERSPEKTYWY AMERYKAŃSKIEGO UNIWERSYTETU PUBLICZNEGO

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**A** – przygotowanie projektu badania | study design, **B** – zbieranie danych | data collection, **C** – analiza statystyczna | statistical analysis, **D** – interpretacja danych | interpretation of data, **E** – przygotowanie maszynopisu | manuscript preparation, **F** – opracowanie piśmiennictwa | literature review, **G** – pozyskanie funduszy | sourcing of funding

### SUMMARY

The objective of this article was to summarize selected successful grant-writing strategies from the perspective of an American public university faculty member. Early sections focused on describing the American public university system aspects that constitute the background to incentivizing and rewarding successful grant-writing. The latter sections focused on examples of resources, from the personal to the national level for grant-writing. The article concluded with tips for successful grant-writing for junior scientists that are known to work regardless of the academic system. The author is a faculty member of one of the first public universities in the U.S. and a member of #1 ranked department in the U.S. in the area of agricultural and biological engineering. The author had a great opportunity to mentor junior scientists in Poland as a U.S. Fulbright Scholar. This article is a timely contribution to the ongoing efforts to reform the Polish university system. Specific solutions dealing with promoting and incentivizing excellence discussed in this article can be a useful input for consideration.

**KEYWORDS:** grant-writing, research funding, American public university

### STRESZCZENIE

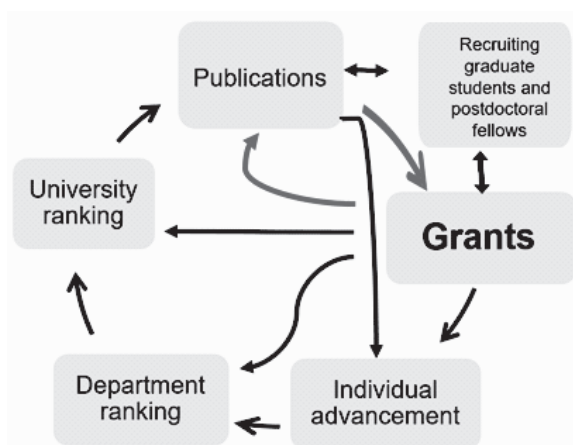
Celem tego artykułu było podsumowanie wybranych strategii pisania podań o dotacje na badania z perspektywy pracownika wydziału amerykańskiego uniwersytetu publicznego. Pierwsza część koncentruje się na opisywaniu aspektów amerykańskiego publicznego systemu akademickiego, które stanowią bazę pisania skutecznych podań o dotacje. Ostatnia część skupia się na środkach wspomagających pisanie grantów od poziomu personalnego do krajowego. W artykule zawarto wskazówki dla młodych naukowców w zakresie skutecznego pisania podań, bez względu na dany system akademicki. Autor jest pracownikiem wydziału jednej z pierwszych uczelni publicznych w Stanach Zjednoczonych i członkiem kadry wydziału notowanego na 1. miejscu w rankingu ogólnokrajowym w dziedzinie inżynierii rolniczej i biologicznej. Miał on doskonałą okazję mentoringu młodych naukowców w Polsce jako U.S. Fulbright Scholar. Ten artykuł wpisuje się do wysiłków na rzecz reformy polskiego systemu uniwersyteckiego. Konkretnie rozwiązania zajmują się promowaniem i udoskonalaniem omówionych w tym artykule kwestii, które mogą być przydatne w tej dyskusji.

**SŁOWA KLUCZOWE:** pisanie podań, dotacje badań, amerykański uniwersytet publiczny

## GRANT WRITING – A PART OF AMERICAN PUBLIC UNIVERSITY CULTURE

Public university systems in the U.S. continue to provide high quality education. Many of them continue to be ranked high in world's rankings of higher education institutions. They attract local and international students. American academia provides many opportunities for junior scientists (defined here as a Ph.D. student, postdoctoral fellow, and Assistant Professor) to launch a life-long career and be successful as a scientist, researcher, or faculty. The institution of public university is an integral part of American culture. It continues to play a major role in educating new generations of leaders, improving lives of individuals, serving communities, fostering the spirit of excellence, discovery, and life-long learning.

Successful grant-writing is an integral part of a "culture" intrinsic to many public American universities. A very simplified graphical presentation of complementary and synergistic relationships related to grant-writing is presented in Figure 1. Public universities rely on faculty members to write and win grants supporting their "scholarship of research, teaching and extension", hire and train graduate students and postdoctoral fellows. Graduate students and postdoctoral fellows engage in scholarly writing, providing basis to attract new grants, and new students. Visibility of scholarly writing, grant activity, and graduate student training in turn, is the basis of individual advancement, impacts the perception of university programs and their ranking among peers.



**Figure 1.** Simplified schematic of grant impact on academic scholarly activities, advancement and ranking

Many junior faculty members are supported by and involved with Cooperative Extension, a "third pillar" (besides research and teaching) of public, land-grant American universities. With more than 100 years of history, extension serves many public, private and non-profit sectors with direct assistance in the areas involving community, natural disaster issues, environment, family, farm, health and nutrition, lawn and garden, pest management, and youth [1].

## IMPACT OF SUCCESSFUL GRANT WRITING ON GRADUATE AND POSTGRADUATE STUDENT RECRUITMENT

Successful grant writing and winning awards enables search and recruitment of new graduate students (both at M.S. and Ph.D. level) and postdoctoral fellows. In less common cases, students write scholarship applications to federal grant programs, or in the case of international students, scholarship applications to their governmental agencies or institutions with a global reach. Foundations, and governmental organizations in the U.S. and abroad (e.g., China, Kazakhstan) also fund "full ride" scholarships covering graduate student expenses for travel, tuition, room and board, books and health insurance for up to 3 years for a Ph.D. at a premiere U.S. universities. These scholarships improve chances of finding a high quality graduate program in the U.S. Submitting a successful application for such scholarships requires initiative, preparation, and good grant writing skills.

In most cases, new M.S. and Ph.D. students are admitted to graduate programs only if their major professor has a grant to support him/her with graduate research scholarship/stipend. It is also a responsibility of the hiring professor to pay a share up to 100% of tuition. Thus, the graduate experience is for many students, a full-time job where the major professor is not only a mentor but also the immediate supervisor who won a grant with the budget to support the student/postdoctoral fellow. A Letter of Intent is drafted by the major professor itemizing deliverables and timeline. These deliverables are often precisely described in the grant funding for the student or a postdoctoral fellow. Admission to graduate programs is very competitive and global. It is driven by timing and availability of successful grant funding, matching skills, competencies and career plans of applying students and postdoctoral fellows. Students and postdoctoral fellows are responsible for completion of project deliverables (e.g., publications, final reports) which become integral part of their thesis or portfolio.

Ph.D. students are often engaged in preparation of research proposals as a required aspect of their writing, performing literature review, critical thinking, finding and articulating knowledge gaps and needs. Also, some Ph.D. students and many postdoctoral students are engaged in writing grant proposals to extend their funding and to continue scholarly activities.

Winning grants is increasingly more competitive. The right preparation strategy improves chances to win a grant funded by U.S. Government, U.S. states, industry, commodity groups, and foundations. In some cases, universities invest in creating graduate stipends in strategic research trusts that have a broad impact or are emerging to be the next highly-fundable area.

## IMPACT OF GRANT WRITING ON ADVANCEMENT IN ACADEMIC RANKS

Incentivizing successful grant-writing is institutionalized in many public universities. New faculty

positions for departments are created after departmental-level consensus and successful presentation (in writing) of the rationale for such an investment of university/public resources. Many new faculty positions are advertised globally to attract the best candidates. New faculty is typically hired at an Assistant Professor level (sometimes considered as a “junior faculty”) and given a probationary “window” of time (e.g., 6 years) to prove his/her scholarly record is worthy of tenure and advancement to Associate Professor rank. This model gives junior faculty enormous freedom to act as professors-in-charge of their research programs. It also creates an enormous fiscal responsibility to support graduate students, postdoctoral fellows, and (in some cases) full-time laboratory or program staff.

Grant-writing is crucial in junior faculty member advancement. Universities incentivize faculty members by guaranteeing 9 month of salary per year. This model rewards faculty who can budget their summer salary into grant applications. Some universities allow the “buy-out” of teaching responsibilities for highly successful faculty members who win large grants and build large programs. The “buy-out” model enables flexibility to incentivize faculty members to write and win competitive grants and build large programs, minimizing concerns about the need to perform well in all areas of responsibility.

### IMPACT OF GRANT WRITING

This model is possible, in part, due to the lack of rigorous “pensum” (interpreted as a mandatory number of instructor-student contact hours for every faculty member). Many public universities employ faculty with negotiable position responsibility statement (PRS). The PRS system enables department-level decision making on individual faculty responsibilities and his/her share of teaching, research, extension, service and administration. This model promotes rewarding highly successful faculty according to their strength based on 0–100% share of responsibilities in main scholarship areas. The U.S. system allows for advancement in ranks based solely on good teaching, instruction, mentoring of students and writing scholarly articles about teaching. More documented impact such as grant funds, number of publications and citations, number of graduate students and their career placements is expected from faculty members with a larger share of the scholarship of research in their PRS. On the other hand, high marks from student class-climate surveys, number of publications about the scholarship of teaching is expected from faculty members with a larger share of the scholarship of teaching in their PRS. Many “land-grant” public universities provide highly successful programing in Extension and Outreach that is core part of university mission, i.e., solving problems important to the rural communities they serve. Thus, faculty members with “extension” appointments serve as a crucial link with stakeholders such as public, industry, local and regional governmental organizations.

## RESOURCES FOR SUCCESSFUL GRANT WRITING FOR JUNIOR SCIENTISTS

### STARTUP PACKAGE

Hiring new faculty member requires departmental, college, university and stakeholders consensus on the position scope. All this is followed by budgeting and a nationwide search. It is very common that a person who wins the competition for a new faculty member position comes from another university and program. This injects the department with fresh energy, diversity of experiences, and an opportunity to engage in new collaborations.

New junior faculty at Assistant Professor positions are given a “startup” package meant for successful launching of scholarly excellence and ones’ career as a faculty member. The departmental level support is seen as crucial. It comes in different forms that can involve a number of following options: laboratory space, funding for new equipment, funding to recruit the first graduate student, lower expectations for administrative and service work for the department, and lower teaching load for first semester or year. All this is presumed that a junior faculty budgets time to successfully write proposals that in relatively short time will result in the “return of investment” that the department and university is making in hiring a new person.

### MENTORING

New faculty members are often assigned a senior faculty mentor. This person helps new faculty to be more effective in managing time, allocating efforts to deliverables that count towards PRS and learning best practices in teaching, research, and extension. Mentoring by senior faculty in the area of grant-writing is crucial for many junior faculty. Mentors can serve with immediate feedback on writing and tips on specific programs and sources of funding. Junior faculty are also encouraged to volunteer their services as ad-hoc peer reviewers of grant applications and to volunteer to be panel members in various granting organizations. This type of volunteering is an extremely valuable lesson for junior faculty, i.e., learning how peer-review and grant proposal review panels work.

### DEPARTMENTAL LEVEL RESOURCES FOR GRANT WRITING

Successful departments have implemented a number of resources to help their faculty to be successful in grant writing. These could include an option to “buy-out” part of teaching responsibilities by highly successful faculty members who bring significant external funds and manage large projects. Some departments have also invested in hiring a person dedicated to handle all forms involved in grants writing such as vita, current and pending support, conflict of interest and also building budgets appropriate for the proposal. In a well-functioning system, this person also helps the faculty member with university-level approval of the grant proposal forms, leaving faculty more time to write the actual science part of the proposal. In addition, this person distributes weekly updates on calls for proposals and current deadlines to all faculty.

Some departments have instituted a transparency in who has been writing submitting winning grants. This helps creating a culture of excellence and also is a motivation for faculty members to write proposals, since lists of faculty submitting and winning proposals are shared with all members on monthly basis. This effort also helps in departmental-level reporting and awarding highly successful faculty. Similar transparency for teaching assignments with course numbers, enrollment, and credit hour can also create a culture of trust and building shared common good for the department.

#### **COLLEGE LEVEL RESOURCES FOR GRANT-WRITING**

Colleges are an intermediate level of administration between the departments and the university. College administration has a unique position to foster collaborative grant-writing efforts. It is common deficiency of less successful universities to limit interactions between faculty members at different departments. Yet, science today is increasingly collaborative both at the grant writing stage and publications. Some successful colleges promote networking by funding professional grant writing help, funding trips to workshops on grant-writing, and inviting grant program managers onto campuses for easy access and questions & answers sessions.

#### **UNIVERSITY LEVEL RESOURCES FOR GRANT-WRITING**

University administration can play a major role helping junior scientists to be successful in winning grant funding. This is a multi-prong approach involves (a) providing funds for travel and meeting with program managers, (b) providing “seed” funding to form collaborative teams and proof-of-the-concept projects in strategically profitable areas, (c) networking with stakeholders (public, industry, government), and (d) communicating broad impact (e.g., health, national defense, safety and security, economy, food, energy, environment, climate change, crime, education).

#### **NATIONAL LEVEL RESOURCES FOR GRANT-WRITING**

Grants.gov [2] is a one-stop clearinghouse for government-level funding available. Many universities help scientists by searching, screening and e-mailing (weekly newsletter) updates on open calls for proposals. Many government-level programs have introduced a 2-tier level of proposal writing aiming at early screening for proposal ideas for further development. This approach calls for mandatory pre-proposal stage (e.g., 2 page maximum) that is initially reviewed and feedback is provided to authors with suggestions on what to improve if the scientist chooses to submit fully developed proposal. This 2-tier approach saves time and resources for the individual scientist or team.

U.S. national level program managers are also available to contact (e-mail and phone) to discuss particular idea for a proposal and how it may fit into programs they manage. This level of assess helps to solicit better quality proposals and can save time and resources for junior faculty investing in writing large proposals with little or no feedback.

#### **PERSONAL LEVEL RESOURCES FOR GRANT-WRITING**

Personal level resources are always available, yet often times they are the most difficult to adopt and use. The level of difficulty ties to human behavior. Writing grant proposals and manuscripts does not have built-in accountability like teaching does. For example, classroom teaching is scheduled into a weekly routine. Many professional writers agree that some level of accountability is helpful in actual completion of writing tasks (e.g., completion of grant proposal or manuscript). Thus, scheduling of writing into one’s daily routine is key for success in work environment where there is “no time” for it. Writing needs to be prioritized. Professional writers argue that the writing time should be scheduled for minimum 30 min a day, preferably in the mornings when the mind is fresh [3]. Your writing time needs to be considered non-negotiable and treated with utmost respect as a meeting with another person. People implementing this personal-level change of attitude towards writing report dramatic increase of productivity, lower stress in managing work-personal life balance [3].

#### **TIPS FOR SUCCESSFUL GRANT-WRITING**

- Start early. Be thankful there is an opportunity to write. Schedule grant-writing into daily schedule (minimum 30 min a day). Keep daily “appointment” for writing as priority and with utmost respect. Develop a habit of daily writing that works for any type of writing including grant proposals, manuscripts, and reports.
- Find mentors and seek feedback. Do not aim for “perfection”, aim at continuous progress with feedback-revisions built in on regular basis.
- Network with successful grant-writers and ask for feedback on your writing.
- Seek collaborators and do not limit it to your research area.
- Publish your completed work in premiere journals of your discipline. Know who cites your work.
- Develop and visualize your publishing and grant funding record on-line using many specialty sites (e.g. ORCID [4], Researcher ID [5], Scopus [6], Google Scholar [7], ResearchGate [8]) and social media (e.g., Facebook, Twitter, and LinkedIn).
- Volunteer to review grant proposals and manuscripts submitted for peer-review.

#### **TECHNICAL TIPS FOR SUCCESSFUL GRANT-WRITING**

- Read, re-read the request for proposals. Make initial check for eligibility. Assess time available. Ask your administration for help with processing forms.
- Schedule daily writing (30 min per day).
- Develop bright, great idea how to address an important problem, need, gap in knowledge.
- Perfect the art of “selling” the idea. Write descriptive title. Focus on excellent Summary where every word is meaningful. Summary is often what decides in reviewers mind on how much time reviewers will read and treat the rest of the proposal.

– Use visuals, schematics, logic models, charts, figures, tables that convey the bright idea, significance, and Broader Impact. Write clearly using short sentences. Repeat the key words and phrases from the request for proposal. Be positive. Show enthusiasm and energy. Show complementary and synergistic collaborations.

– Complete a literature review that clearly documents that there is indeed an important problem to solve, gap in knowledge to fill, a need to address. Make sure you can clearly articulate that the problem/gap/need has a Broader Impact, i.e., it has a potential to benefit the society to which most of the public and experts will agree.

– Write focused objective(s) or hypotheses to be tested that clearly focus on the identified problem, gap or need. Your objectives must result in deliverables even if the proposed research will not yield expected results. Likewise, your hypotheses must be objectively testable. Avoid open-ended objectives. Be specific of what exactly will be measured, tested and write it convincingly to respond to “why-”, “what for”-type of questions.

– Write the rationale statement to highlight what will be possible when the gap/need is addressed and problem solved and how it will benefit the society.

– Write a long-term goal. Highlight how your proposed project fits into broader and longer effort to solve some major problem.

– Add Methods that clearly follow the logic of objectives. Make sure reviewers understand you have means (e.g., laboratory space and equipment) to successfully complete this project.

– Write deliverables which are concrete outcomes (e.g., manuscripts published, major oral presentations at conferences, graduate students trained, progress and final report).

– Include preliminary results to project the aura of technical excellence, feasibility, and confidence that the proposed project will have high probability of success and good use of public or sponsor funds.

– Document prior work, collaborations, evidence of successful project completion.

– Develop realistic scope, budget and timeline for key deliverables.

– Address any constructive feedback from previous submission (if re-submitting).

– Finally, do not take rejection to grant proposal as a personal offense to you. Treat it as problem with the proposal, not with you.

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