

2023 MEDTRONIC/BMES Student Design Competition

Judging Criteria

All design competition proposals must be submitted by BMES Student(s) or Student Chapters by **Thursday, August 3 at 3:00 p.m. ET**. A panel of reviewers will serve as judges to select the finalists. This year's design competition will feature four tracks, and three finalist teams will be selected from each track. The top BMES designs will be invited to the 2023 BMES Annual Meeting to present their work during a special session. The designs of these finalists will be evaluated during their presentation, and a first, second, and third-place winner will be chosen.

Judging criteria for Design Competition Submissions

1. **Product need and market potential X/5 pts** — How well does the team describe and document the overall product need and the specific requirements for their device as specified by the consumers? Both qualitative and quantitative requirements should be described. Has the team explained the potential market for such a device? The size and demographics of the potential market should be described, as well as a clear explanation as to why the proposed device fits the needs of that market.
2. **Device utility and novelty X/5 pts** — How well does the team describe their proposed design, and how does it satisfy the consumer's needs? Have they described the current state of design and how their product fits into or complements the existing market? What aspects of the proposed design make it especially useful and novel compared to the current market?
3. **Technical feasibility X/5 pts** — Is the proposed design based on logical and sound engineering analysis and judgment? Has the team addressed the major technical challenges and demonstrated a reasonable plan for solving them?
4. **Budget and economic plan– X/5 pts** — Is the proposed budget for the prototype device reasonable, and does the long-term economic plan for the product fit with the customer and market requirements?
5. **Writing clarity and style X/5 pts** — Is the five-page proposal clearly written and in an appropriate style for a BMES abstract? Is the language clear and free of grammatical and spelling errors? Are the concepts and ideas conveyed clearly and concisely to an engineering audience?

2023 MEDTRONIC/BMES Student Design Competition

Judging Criteria

1. **Product need and market potential** – How well does the team describe and document the requirements and the potential market for the device they have designed?
2. **Device description** – How well does the team describe their solution to the design problem? Does the product satisfy the specific customer requirements and a demonstrated market need in a unique way? Is the concept novel and patentable? If so, has it already been submitted for protection, or are there plans to do so?
3. **Device performance** – How well does the team demonstrate the product's actual performance? How well does the team describe the product performance compared to stated requirements and predicted capabilities? How well has the team identified limitations in the design and proposed solutions?
4. **Economic plan** – How well did the team follow the proposed budget? Is there a reasonable plan to increase production of the device (i.e., have issues associated with mass production been addressed)? Has the team presented a reasonable economic plan for commercialization or at least considered the major challenges in doing so?
5. **Presentation clarity and style** – Does the design clearly delivered and presented in a professional manner? Does the presenter do a good job answering questions? Are the slides clear and free of grammatical and spelling errors, and are the concepts and ideas conveyed concisely to an engineering audience?

2023 MEDTRONIC/BMES Student Design Competition Application

The **narrative** may not exceed 5 pages in length (single-spaced, 12-point font). Please include any images referenced in your narrative in the body of the narrative, NOT as appendices. Please prepare a narrative description that consists of the following:

- **Executive summary*** (1 page). A summary that presents the justification and overall description of the project. See below for additional details.
- **Description of the problem to be solved** (no more than 1/4 page). What is the problem you have solved? What is the market and/or industry need you intend to address?
- **Project objective statement** (no more than 1/4page). How does your team intend to address the problem? How does your final design solve the problem?
- **Documentation of the final design** (1/2 page). Be sure to include applicable standards and risk analysis.
- **Prototype of the final design** (1/2 page). Paste graphical representations and photographs in the document and, if available, provide a link to a video. **Note:** If the current team was not involved from the beginning, please specify what your team has worked on vs. what progress had been made by others (other students or others) before your involvement.
- **Proof that the design is functional and will solve the problem** (1/2 page). Include evidence such as test data, market research, or pre-clinical/clinical trials.
- **Results of a patent search and/or search for prior art, assessment, and patentability** (1/2 page). Two excellent resources for this search are www.uspto.gov and your institution's technology transfer office. Regarding marketplace competition, what is currently being used to solve the problem, and/or what are the anticipated alternate methods that could compete with you in the future?
- **Anticipated regulatory pathway** (510(k) vs. PMA, etc.) (1/4 page). Consider researching how the FDA has treated analogous devices.
- **Estimated manufacturing costs** (1/2 page). Provide detailed per unit cost breakdown, including volume discount, for components, final assembly, quality assurance, etc.
- **Potential market and impact** (1/2page). Define the potential market size, selling price, and distribution channels. Who would your customers be (i.e., who will be purchasing the product), and who would the end users be (i.e., who would be using the product). If possible, quantify the number of potential users and the potential impact the product could have (# of people who would benefit from use, etc.)

**What's in an Executive Summary?*

An executive summary summarizes the above and serves as a stand-alone justification for why this idea should be pursued. Be sure to address the essentials, including:

- *Problem:* What is the problem you aim to solve?
- *Solution:* How do you solve it?
- *Competition:* What are alternate methods of solving the problem or anticipated methods that could be in competition with you in the future?
- *Differentiation:* Why will people choose your solution over others?
- *Technical Feasibility:* Have you done it, and can it be done?
- *Regulatory* What FDA approvals will be required?
- *Sales and Marketing:* What is the estimated size of the market (with rationale)? Who is the buyer/customer/user? From whom will they buy it? At what pricing?

2023 MEDTRONIC/BMES Student Design Competition

Before You Submit:

- All design project proposals must be submitted by active BMES Student(s) or Student Chapters.
- You can only submit your design once and only to one track.
- You may submit a secondary design to one of the other tracks.
- Email your submission to Michele Ciapa at Michele@bmes.org by Thursday, August 3 at 3:00 p.m. ET
- The subject line should be "2023 Medtronic Design Application".

www.bmes.org/bmes2023-design-comp