How to Succeed in Getting an MSCA Individual Fellowship?

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Marie Skłodowska Curie Fellow

CLEAN Project

European Commission

IZMIR BIOMEDICINE AND GENOME CENTER

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Before IBG			
2001-2005	Physics, B.Sc.	METU	
2005-2007	Physics, M.S.	Koç Üniversity	Prof. A. Sennaroğlu
2007-2012	Optical Science and Engineering, Ph.D.	UNC-Charlotte & Johns Hopkins Medical School	Prof. N. Fried Dr. A. Burnett
2012-2016	Post-doc Research Fellow	Harvard Medical School	Prof. B. Vakoc

Identification tag of my funded project

CLEAN – Well Confined Mucosal Laser Ablation with a Negative Pressure Based Endoscopy Capsule

Duration: 24 mo.

Type of action: MSCA-IF-EF-RI

Total score: 96%

Panel: Life Sciences

My previous applications: 2016 (*fail* due to 10-page limit)
2017 (*fail* due to lack of scientific advisory)

Overall success rate in RI = 19.39%
Overall success rate in ST = 12.40%

Turkish success rate in RI = 11.76%
Turkish success rate in ST = 4.17%

My perspective for a successful MSCA-IF application
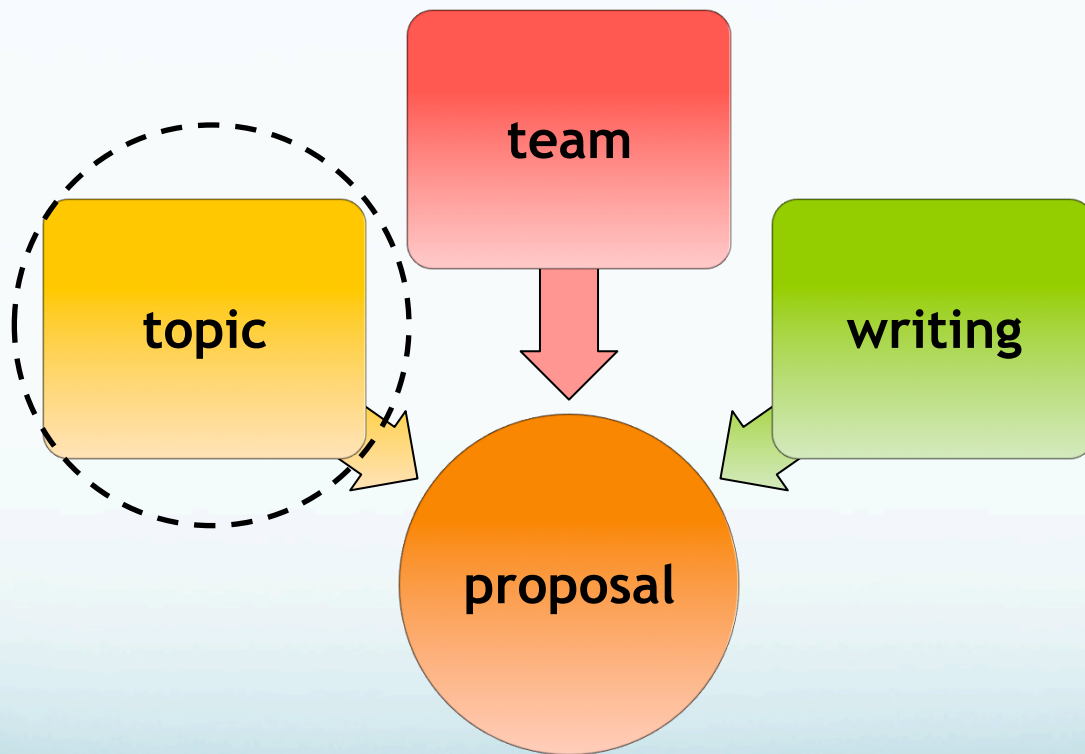
Selection of Research Topic

novelty and
state-of-the-art
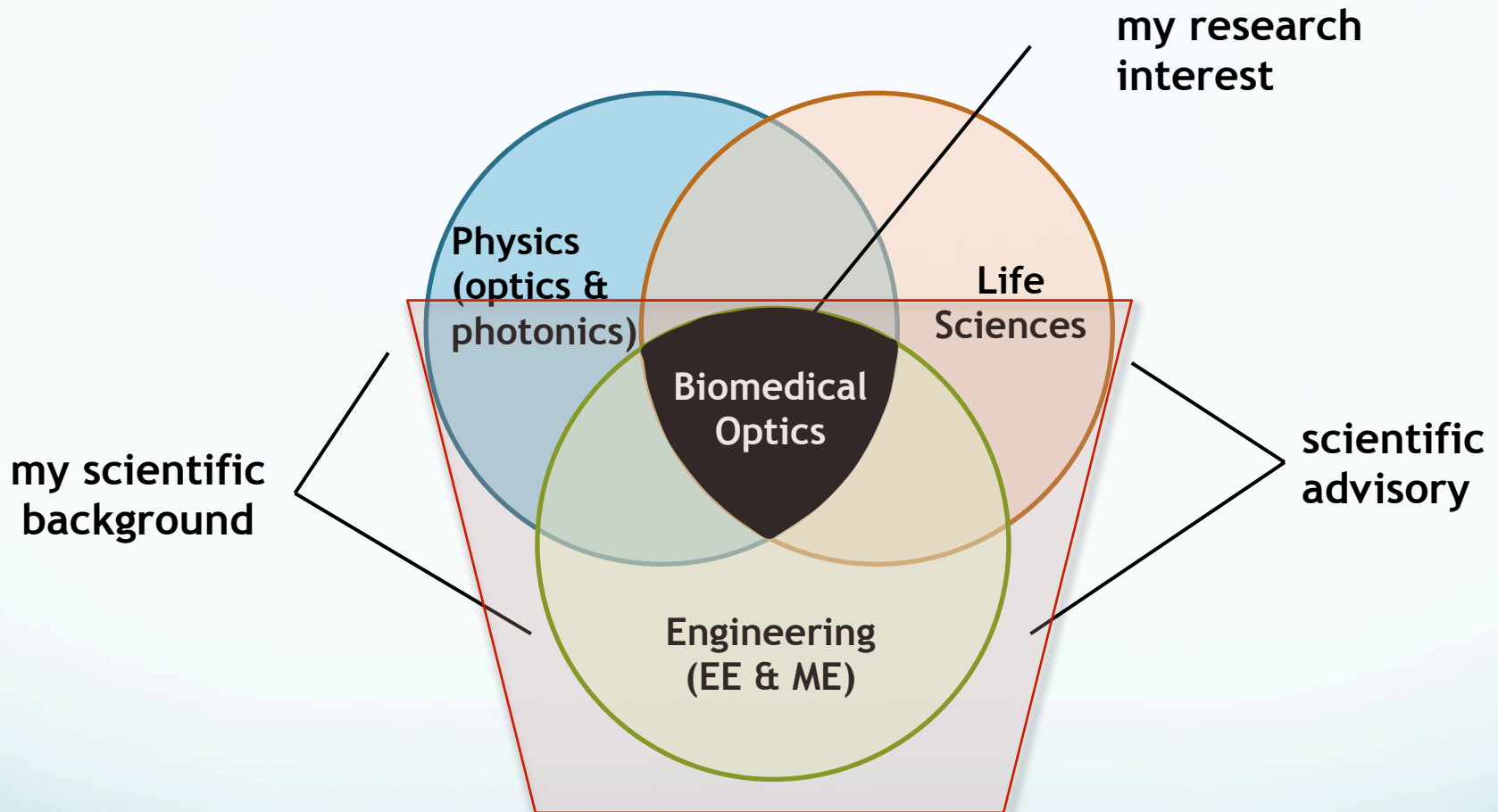
research projection of
host inst.

your research interest

your academic
background

In my proposal

Clarification of the Knowledge Exchange & Research Topic
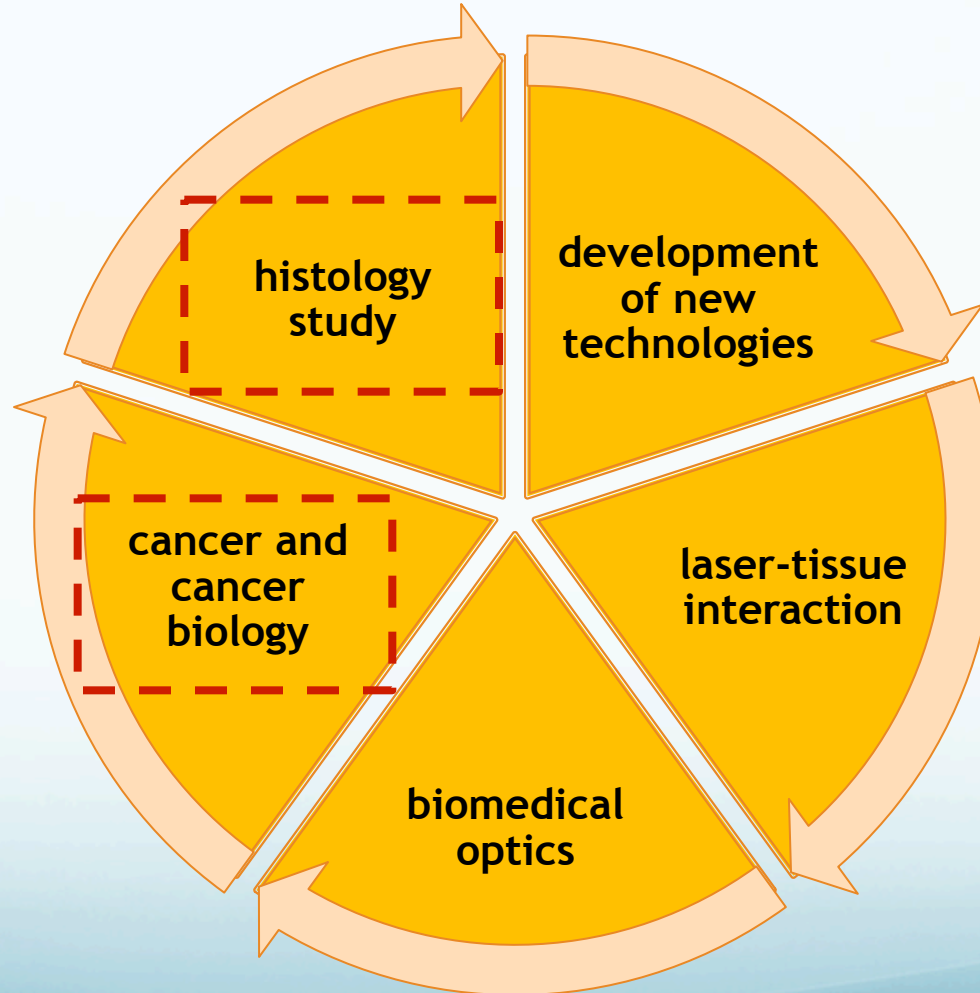
My perspective for a successful MSCA application
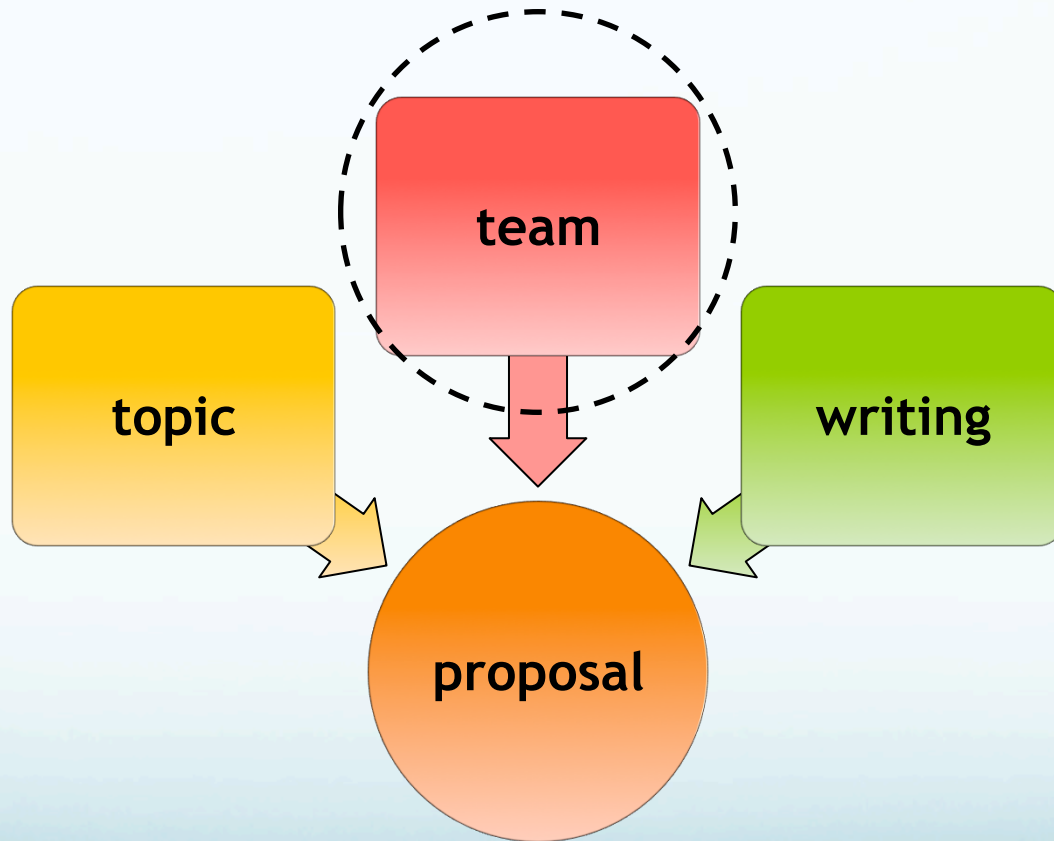
Build a strong scientific supervisor team around the proposal

filling gaps in the proposal

interdisciplinary approach

academic training

correct mentoring
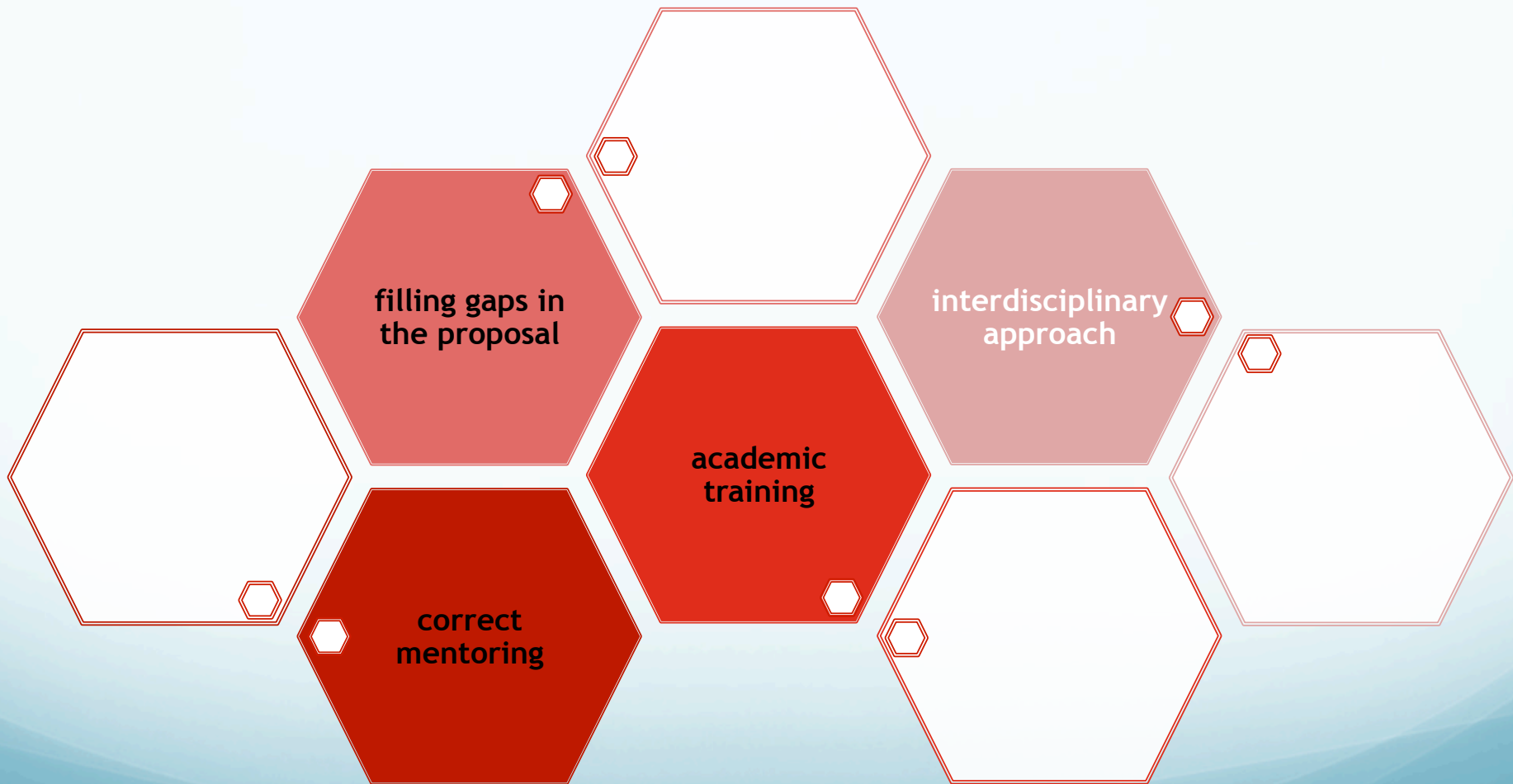
In my proposal

Mehmet Ozturk, Ph.D.
(IBG – cancer biology)
h = 45

Omer Ilday, Ph.D.
(Bilkent University –
laser electronics)
h = 32

My perspective for a successful MSCA application

topic

team

writing

proposal

excellence

weight: *50.00%*

impact

weight: *30.00%*

implementation

weight: *20.00%*

Part – B1
(10-page limit)

CV

5-page limit

capacity of the host

2-page limit

ethical issues

no limitation

Part – B2
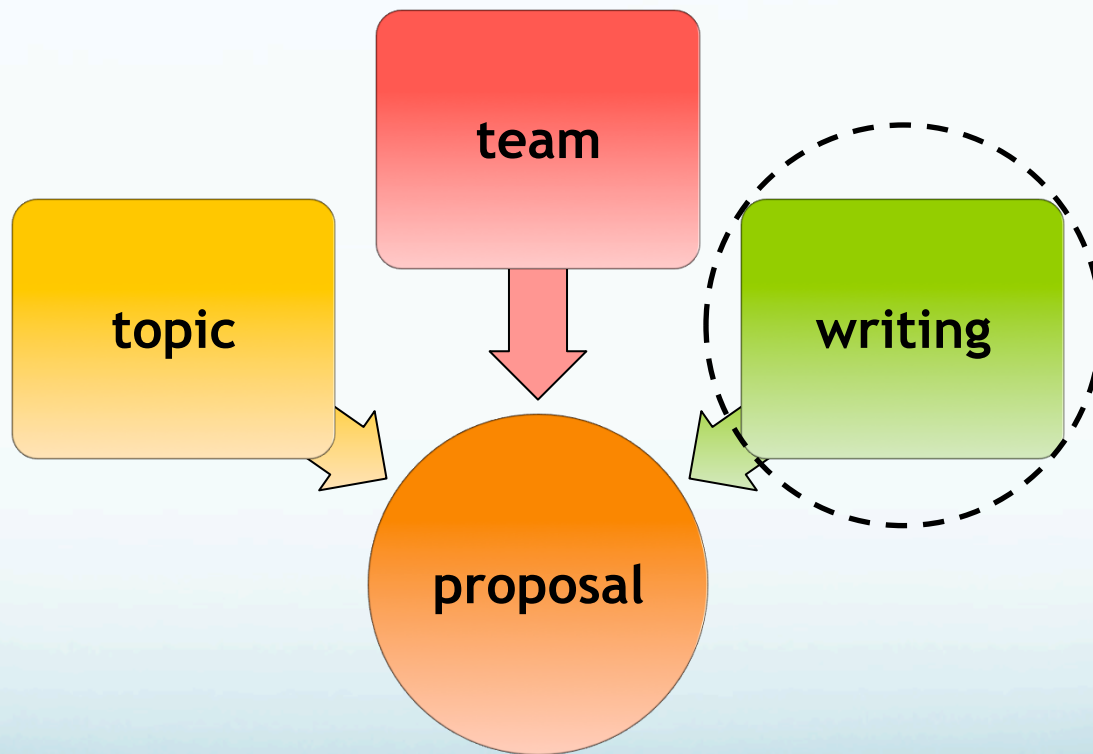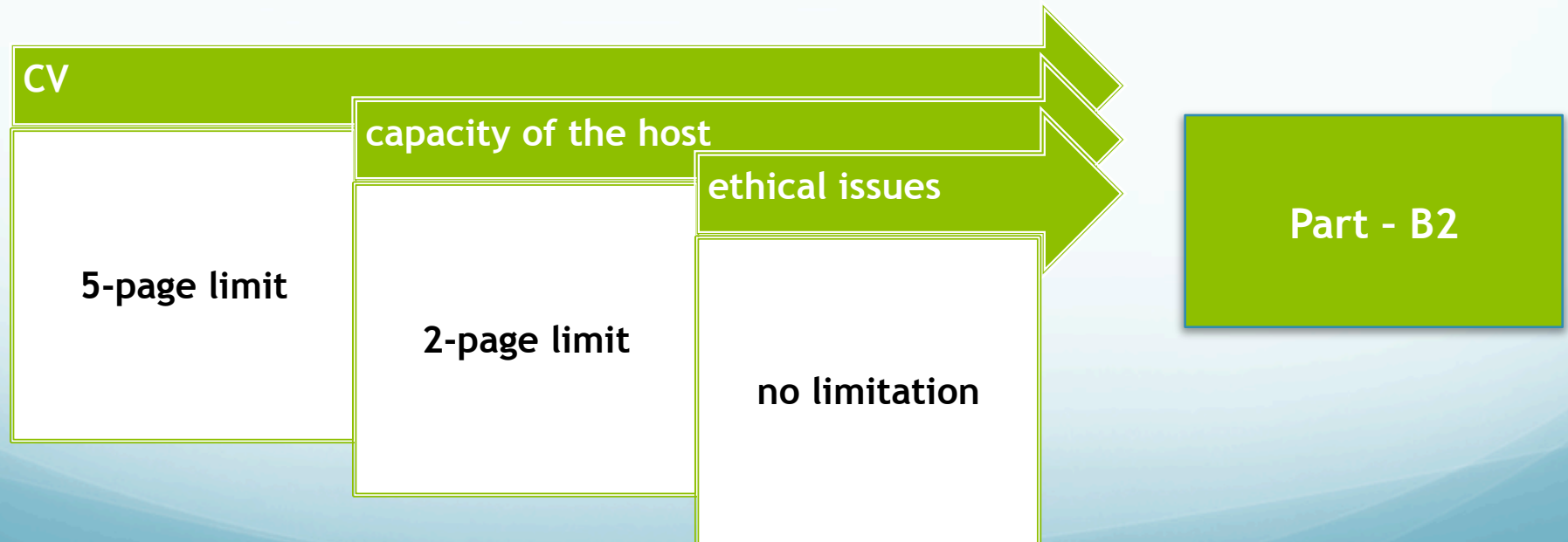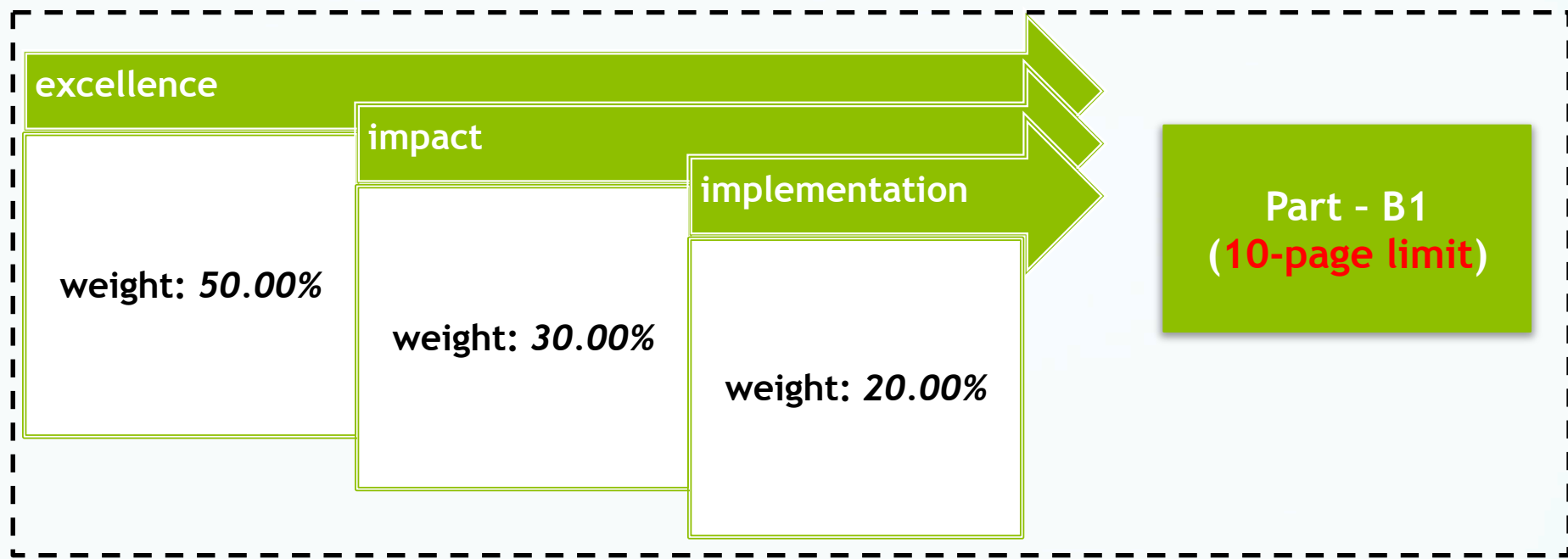
Writing: Objective and Aims

Objective of the project should be *short*, *comprehensive* & *clear*.

Specific aims of the project should be *complementary* & *traceable*.

Specific aims of the project can be linked with the main Work Packages.

In my proposal

"CLEAN" – EF-RI

1. EXCELLENCE

1.1. Quality and credibility of the research/innovation action

1.1.1. Objective & specific aims: This proposal is an interdisciplinary research action. The *objective* of the CLEAN project is to develop a novel endoscopic capsule design and to build a prototype endoscopy system using this capsule, which provides local ablation to the superficial layer of target mucosal tissue with sufficient depth to remove abnormal tissue. However, this depth will be shallow enough to avoid the residual effects of therapy within deeper tissue layers. The *specific aims* are: **Aim-1:** To develop a computer modelling to mimic the thermal dynamics of the capsule. It is to characterize the total heat energy needed to successfully ablate the lining layer, an adequate sliding speed along the oesophagus, an adequate therapy time for effective thermal target layer ablation, and the amount of thermal injury induced to the various oesophagus layers. **Aim-2:** To develop the configuration of the capsule in a computer-aided design program. This original design simply extends the target layer above and away from its underlying layers to achieve a well-confined therapeutic effect by delivering vacuum force. With the confinement of therapeutic effect, it is aimed that deeper tissue structures are partially separated from ablation region. **Aim-3:** To construct and optimize a prototype-level endoscopy system for pre-clinical *ex-vivo* tissue trials. A high power, 1380-nm diode laser will be used for the therapeutic photothermal ablation. **Aim-4:** To investigate the feasibility of the design and to evaluate the performance of the prototype system in *ex-vivo* sheep oesophagus

Writing: Evaluation Summary Report

Very helpful to improve your proposal.

Very useful to review your research topic and idea.

Try to address each weakness listed in the report.

In my proposal

ESR can be very useful to produce new research ideas.

Criterion 1 - Excellence

Score: **4.80** (Threshold: 0/5.00 , Weight: 50.00%)

• Quality and credibility of the research/innovation project; level of novelty, appropriate consideration of inter/multidisciplinary and gender aspects
• Quality and appropriateness of the training and of the two way transfer of knowledge between the researcher and the host
• Quality of the supervision and of the integration in the team/institution
• Potential of the researcher to reach or re-enforce professional maturity/independence during the fellowship

Strengths:
- The proposal is focused on an ambitious action and the level of novelty is high. The state of the art is very well discussed, showing the crucial need for new therapies in this surgical area.
- The project is interdisciplinary, combining biophysics, laser-tissue interaction and mechanical design.
- Overall quality of the training and the two way transfer of knowledge between the researcher and the host are very well demonstrated.
- The researcher will gain new and important high quality skills in biological sciences and in addition, will became acquainted with practical skills in biosafety laboratory settings.

835907/CLEAN-29/01/2019-09:43:50

- The researcher will transfer the skills in lasers, biomedical optics, OCT imaging, laser safety. Associated with document Ref. Ares(2019)497599 - 29/01/2019
- The supervisor is a very good scientist, with an experience in biochemistry, cancer biology, medical biology and has an experience in conducting various scientific projects.
- The supervisor has extended international cooperation.
- The past experience and achievements until now prove very well the potential of the researcher for enhancing his professional career. The high quality track record of publications demonstrates convincingly the ability of the researcher for further professional development.

Weaknesses:
- Although the approach is promising and proposed methodology is very well suited for conducting this project, it lacks the some explanation on the capsule navigation.

Criterion 2 - Impact

Score: **4.80** (Threshold: 0/5.00 , Weight: 30.00%)

Writing: Organization

Demonstration of your *writing skills*, *personality* in some ways, *determination*, and *motivation*.

Impact + Implementation = Excellence
(*Details* make the difference in a high level competition)

Use 10-page limit *wisely*.

Highlight key notes if necessary.

May be useful to use a suitable color coding throughout the proposal.

Using *table*s save a lot of space.

Lists help the panelist to monitor what you want to emphasize.

Impact

1) Enhancing the potential & future career prospects of the Researcher:

A list of *short-term* & *mid-term* career goals may include;

- To accomplish the mobility phase and get ready for a permanent position.

- To master of the skills in the field of light-tissue interactions, biological tissue structures, and histology studies.

- To have the stable superposition of new & present skills with new achievements.

- To transfer his knowledge to colleagues in the Host for building new experiences on existing ones.

Impact

2) Quality of the proposed measures to exploit and disseminate the action results:

A list at the local level, national level, and international level may include;

- Internal seminars, scientific mentoring in the host.

- National & International symposiums (e.g., National Optics, Electro-optics and Photonics Conference or SPIE Photonics West)

- Scientific Publications (Biomedical Optics Express, J Biomedical Optics etc.)

- Technology Transfer Office (e.g., DEU DETTO)

- Start-up company (be aware of the regulations)

Impact

3) Quality of the proposed measures to communicate the action activities to different target audiences:

High school visits as a volunteer MSCA ambassador in Turkey.

Developing a research project with high school students.

Interviews with the universities and local broadcasters.

Design a web page dedicated to the project.

Implementation: Gantt chart

No.	Name/Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
WP-1	Computer modelling & simulations	■	■	■	■	■	■	■	■	■															
T-1.1	Development of Monte Carlo & thermal models	■	■	■	■																				
T-1.2	Calculation of temperature profile & thermal damage				■	■	■																		
T-1.3	Determination of role of sliding speed in ablation						■	■	■	■															
DE-1	A modelling tool that numerically analyses thermal behaviour of the capsule									■															
MS-1	Successfully simulating sliding of the capsule along the surface during ablation									★	→ 3rd week														
WP-2	Development of the new capsule										■	■	■												
T-2.1	Designing the configuration of the capsule										■	■													
T-2.2	Machining the capsule											■	■												
DE-2	An original capsule design using negative pressure approach for well-confined ablation												■												
MS-2	Production of the capsule from biocompatible Polyethylene Methacrylate Acrylic material												★	→ 4th week											
WP-3	Constructing & optimization of endoscopy system												■	■	■	■	■	■							
T-3.1	Characterization of optical components & a diode laser												■	■	■										
T-3.2	Adjusting vacuum suction & system sealing														■	■									
T-3.3	Assembling all parts & initial testing															■	■	■							
DE-3	A prototype endoscopy system using an original capsule for the use of *ex-vivo* oesophagus studies																		■						
MS-3	Ensuring the integration of the endoscopy capsule with fiber optic cabling																	★	→ 1st week						
WP-4	Evaluation & validation of endoscopy system																		■	■	■	■	■	■	■
T-4.1	*Ex-vivo* sheep oesophagus studies																		■	■	■	■			
T-4.2	Histology examination & analysis of the tissue samples																					■	■	■	■
DE-4	Demonstration of well-confined photothermal ablation of a large mucosa surface in a single surface scan in *ex-vivo* sheep oesophagus																								■
MS-4	Successful labelling of tissue samples with LDH staining for histology analysis of thermal damage in cellular level																							★	→ 3rd week
TR-1	Thematic courses	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TR-2	Experimental animal use certificate programme												■												
TR-3	Occupational health & safety training programme	■																							
TR-4	Round-table training sessions on research proposals										■								■						
TR-5	Write a better proposal, manage a successful project														■								■		
DI-1	National conference & conference abstract						■																		
DI-2	International conference & conference proceedings																								■
DI-3	Scientific original research journal manuscript																							■	
DI-4	Provisional patent application																■								
DI-5	Start-up company																					■			
DI-6	1-day workshop at IBG																				■				
DI-7	Updating web page	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Implementation: Tasks & Resources

Table 4: Allocation of tasks and resources.

WP no	1	WP title	Computer modelling & simulation	Starting month	1	Duration	9 months
Person in charge			Serhat Tozburun, PhD				

WP team	Name	Responsibility in Project	Responsible tasks / Month allocation
	Serhat Tozburun, PhD	Experienced Researcher	T-1.1, T-1.2, T-1.3 / 1st to 9th month
	Mehmet Öztürk, PhD	Supervisor	T-1.1, T-1.2, T-1.3 / 1st to 9th month
	Omer Ilday, PhD	Scientific Advisor	T-1.1 / 1st to 4th month

Tasks (T)	No	Description of Task	Allocation of resources
	1.1	Development of Monte Carlo & thermal models	PC, MATLAB university license
	1.2	Calculation of temperature profile & thermal damage	PC, MATLAB university license
	1.3	Determination of role of sliding speed in ablation	PC, MATLAB university license

Part B – Page 9 of 22

"CLEAN" – EF-RI

WP no	2	WP title	Development of the new capsule	Starting month	9	Duration	4 months
Person in charge			Serhat Tozburun, PhD				

WP team	Name	Responsibility in Project	Responsible tasks / Month allocation
	Serhat Tozburun, PhD	Experienced Researcher	T-2.1, T-2.2 / 9th to 12th month
	Mehmet Öztürk, PhD	Supervisor	T-2.1, T-2.2 / 9th to 12th month

Tasks (T)	No	Description of Task	Allocation of resources
	2.1	Development of design and configuration of the capsule	PC, SOLIDWORKS university license
	2.2	Machining the capsule from biocompatible PMMA material	IBG machine shop

WP no	3	WP title	Constructing & optimization of endoscopy system	Starting month	12	Duration	7 months
Person in charge			Serhat Tozburun, PhD				

WP team	Name	Responsibility in Project	Responsible tasks / Month allocation
	Serhat Tozburun, PhD	Experienced Researcher	T-3.1, T-3.2, T-3.3 / 12th to 18th month
	Mehmet Öztürk, PhD	Supervisor	T-3.1, T-3.2, T-3.3 / 12th to 18th month
	Omer Ilday, PhD	Scientific Advisor	T-3.1 / 14th month

Tasks (T)	No	Description of Task	Allocation of resources
	3.1	Characterization of optical components & a diode laser	Optical spectrum analyser, optical components, fibre scope
	3.2	Adjusting vacuum suction & system sealing	Vacuum components
	3.3	Assembling all parts & initial testing	Fibre coupled 4-channel laser, optics power meter

WP no	4	WP title	Evaluation & validation of endoscopy system	Starting month	18	Duration	7 months
Person in charge			Serhat Tozburun, PhD				

WP team	Name	Responsibility in Project	Responsible tasks / Month allocation
	Serhat Tozburun, PhD	Experienced Researcher	T-4.1, T-4.2 / 18th to 24th month
	Mehmet Öztürk, PhD	Supervisor	T-4.1, T-4.2 / 18th to 24th month
	Mehmet Ensari Guneli, DVM, PhD	Scientific Advisor	T-4.1 / 18th and 19th months
	Alper Bagriyanik, MD, PhD	Scientific Advisor	T-4.2 / 23rd and 24th months

Tasks (T)	No	Description of Task	Allocation of resources
	4.1	Evaluation of the system on ex-vivo sheep oesophagus studies	Fume hood, refrigerator
	4.2	Histology examination & analysis of the tissue samples	-80° freezer, IBG histopathology core facility

Implementation: Risk management

Table 5: Risk management.

Risk category	Risk	Likelihood	Mitigation method
Management	Lack of integration within the project team and the work packages.	Low	An evaluation meeting with all team members in every 4 months through video calls or on site visits.
	Financial risks.	Low	Cost analysis & budgeting early in the grant agreement. Sec. 1.3.2.
Infrastructure	Insufficient computational resource.	Medium	Use of high-performance PCs at IBG bioinformatics unit.
	Failure of optical instrumentation.	Low	Access to alternative equipment guaranteed by the extensive number of resources available at Bilkent University.
	Delays in realization of the different tasks.	Medium	Specification of concrete milestones. Generous time planning.
	Inappropriate methodology.	Low	Elaboration of monthly scheduled internal follow-up presentations and contingency plans in every 6-months.
	Inaccessibility to services/facilities	Low	Interviews and consultations early during the grant agreement.
	Inaccessibility to key research data	Medium	Bibliography granted by accessing to comprehensive printed and electronic publications provided by DEU library.
Research work	Lack of mimicking the model in realistic way.	Low	Taking account blood perfusion and metabolic heat generation. Employing Neumann boundary conditions.
	Failure of providing photothermal mucosal ablation.	Medium	Focusing laser beam by using a miniature GRIN lens. Using another diode laser to increase the laser output power.
	Insufficient control on sliding speed of the capsule by using a single-axis stage with manual actuation.	Low	Use of a single-axis stage with a fully automated, highly sensitive actuator.
Design	Clogging of small holes within the slot delivering negative pressure by the plucked mucosal tissue/dirt.	High	Reconfiguration of the capsule using a line-slit rather than using holes to prevent clogged tubing. Tasks: 2.1, 2.2, 4.1

3.4. Appropriateness of institutional environment (infrastructure):

Table 6: List of infrastructure and facilities that will be used for the success of the Project.

Facilities	Description
50-m^2 lab space (IBG)	All actions will be performed in Translational Biophotonics & Optical Imaging Lab
Histopathology core facility (IBG)	Histology examination studies will be performed in this facility.
Machine-shop (IBG)	All mechanical parts of the endoscopy system will be machined in this facility.

Infrastructure	Description	Infrastructure	Description
Fiber scope (Thorlabs)	To examine the fibre tips.	Refrigerator (Bosch)	To keep the fresh *ex-vivo* oesophagus tissues at 4°C.
Optics power meter (Thorlabs)	To measure the laser power.	-80°C freezer (Eppendorf)	To keep samples embedded into the O.C.T gel.
Optomechanical components (Thorlabs)	To use in setting optics.	MATLAB software	To simulate thermal behaviour of the capsule.
Laser spectrum analyser (Yokogawa)	To measure laser wavelength.	SOLIDWORKS software	To design an original endoscopy capsule.
Optics table (Thorlabs)	To use in optics related studies.	PC (3.1 GHz, 16 GB DDR)	To perform the simulation and design studies.

Writing: Polishing & Proof Reading

Need to have a few iterations.

Do not wait until the last minute.

Polishing never ends.

Use short but effective sentences.

European-style writing in English is slightly different from writing in US-style English. Be aware of it!

Ask help for proofreading from your friends, colleagues, and more importantly project supervisor.