

AAPM Hub and Spoke Residency Models Workshop:

Recruitment, Training and Evaluation

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Acknowledgements

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Outline

- I. Introduction: Program Description and History
- II. Hub and Spoke Program Experience
 - A. Resident Recruitment
 - B. Resident Training
 - C. Resident Evaluation
- III. Program Accreditation Experience

Residency Program Description

Motivation

- Joint Louisiana State University (LSU) and Mary Bird Perkins Cancer Center (MBPCC) M.S. and Ph.D. in Medical Physics program (CAMPEP accredited)
 - Graduates ~6 students per year
- MBPCC goal to accommodate 6 new residents per year in time for the 2014 requirement
- AAPM Report 90 recommended physicist-to-resident ratio of 2:1
 - 12 MBPCC physicists → 6 total residents maximum
 - 3 new residents per year (2-year program)

Residency Program Description

Introduction

- *How do we accommodate the other 3 needed positions per year?*
- Solution was to develop partnerships with regional medical physics groups to provide clinical residency training
- Hub-and-spoke model (TG-133)
 - MBPCC responsible for initial accreditation, curriculum development, resident performance tracking, scheduling exams, clinical training, etc.
 - Partner sites responsible for clinical training

Residency Program Description

Residency Consortium

- Takes advantage of facilities with good clinical physics but inadequate administrative resources to start and maintain program
- Began approaching potential partners in early 2010
 - Good support from physicists to “train our own”
 - Currently 3 partner sites in Consortium with MBPCC



Current Partners

★ Mary Bird Perkins

□ OncoLogics

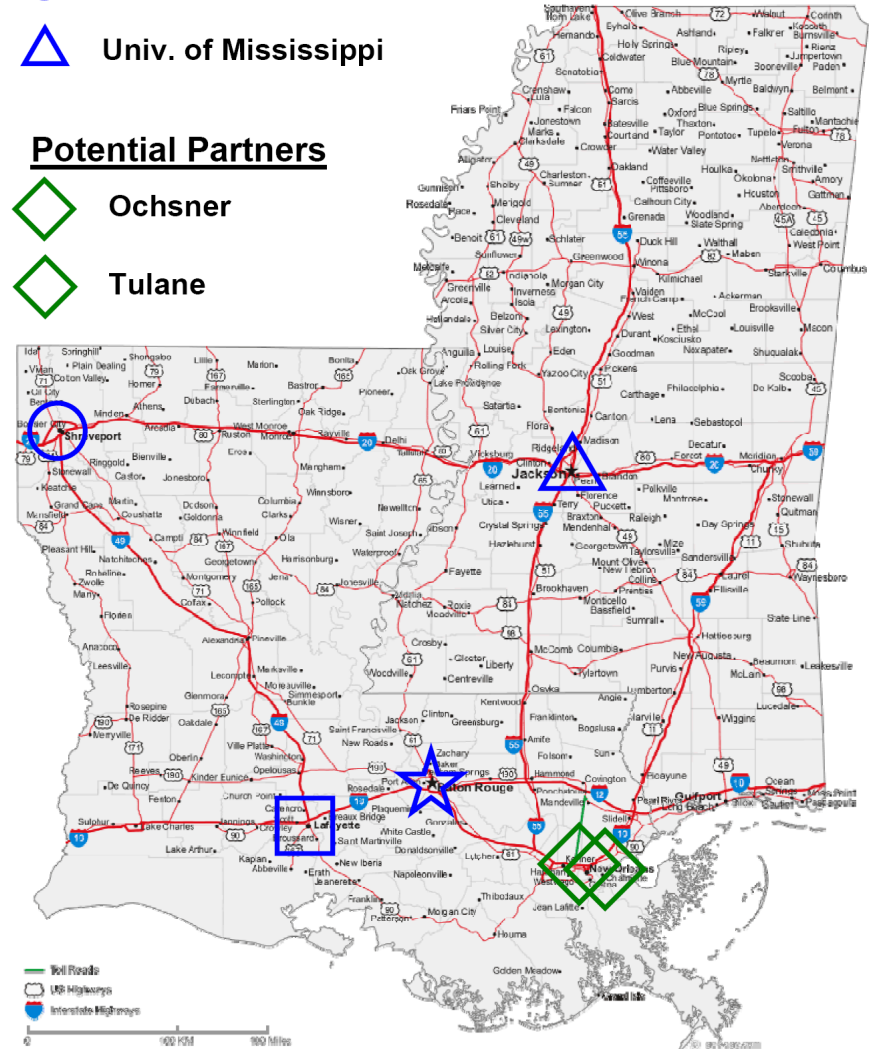
○ Willis-Knighton

△ Univ. of Mississippi

Potential Partners

◇ Ochsner

◇ Tulane



Residency Program Description

Residency Consortium

- Mix of private, community, for profit, nonprofit, and academic institutions
- Offers broader range of clinical procedures, technology, equipment, etc. than typically available at single institution
- Written agreements exist between MBPCC and partner sites

Residency Program Description

Affiliate Agreements

- Generic agreement developed outlining roles & responsibilities of MBPCC and affiliate sites
- Minor changes (i.e., unrelated to residency training) made in each agreement specific to the affiliate's program
- Completion of final agreements took ~1 year

Medical Physics Residency Program Affiliate Agreement

This Medical Physics Residency Program Affiliate Agreement (the "**Agreement**") is entered into by and between:

Mary Bird Perkins Cancer Center, a Louisiana non-profit corporation, represented herein by its President and Chief Executive Officer, Todd D. Stevens (hereinafter called "**MBPCC**"); and

who did declare as follows:

WHEREAS, the purpose of this Agreement is to set forth the roles and responsibilities of each party that elects to and which MBPCC permits to participate in MBPCC's Medical Physics Residency Program (the "Residency Program");

WHEREAS, MBPCC will affiliate with those institutions that, from time to time, agree to participate in the Residency Program as described in this Affiliate Agreement;

WHEREAS, initially, MBPCC proposes to affiliate with institutions capable of fulfilling the Affiliate obligations; those organizations include, but are not limited to, Willis-Knighton Cancer Center in Shreveport, LA, OncoLogics, Inc. (for the Louisiana locations exclusively) and The University of Mississippi Cancer Center in Jackson, MS;

WHEREAS, the primary purpose of the Residency Program is to provide clinical residency training in radiation oncology physics for M.S. and Ph.D. degree holders, to address a national shortage of medical physics residency positions;

WHEREAS, the Residency Program is not a component of the joint LSU / Mary Bird Perkins Medical Physics Program;

WHEREAS, this Agreement is intended to establish an Affiliate that will maintain at least one medical physics resident in radiation oncology physics and work with MBPCC to provide clinical medical physics training;

WHEREAS, the Residency Program will be operated pursuant to the guidelines set forth in the American Association of Physicists in Medicine (AAPM) Report 90, "Essentials and Guidelines for Hospital-Based Medical Physics Residency Training Programs" and the Commission on Accreditation of Medical Physics Educational Programs, Inc. (CAMPEP) "Guidelines for Accreditation of Residency Education Programs in Medical Physics";

Residency Program Description

Affiliate Agreements

- MBPCC Commitments:
 - Develop the program curriculum
 - Administration of program (Coordinating advisory committee, Resident evaluations, Oversee compliance with training requirements)
 - Work with affiliates to obtain CAMPEP accreditation

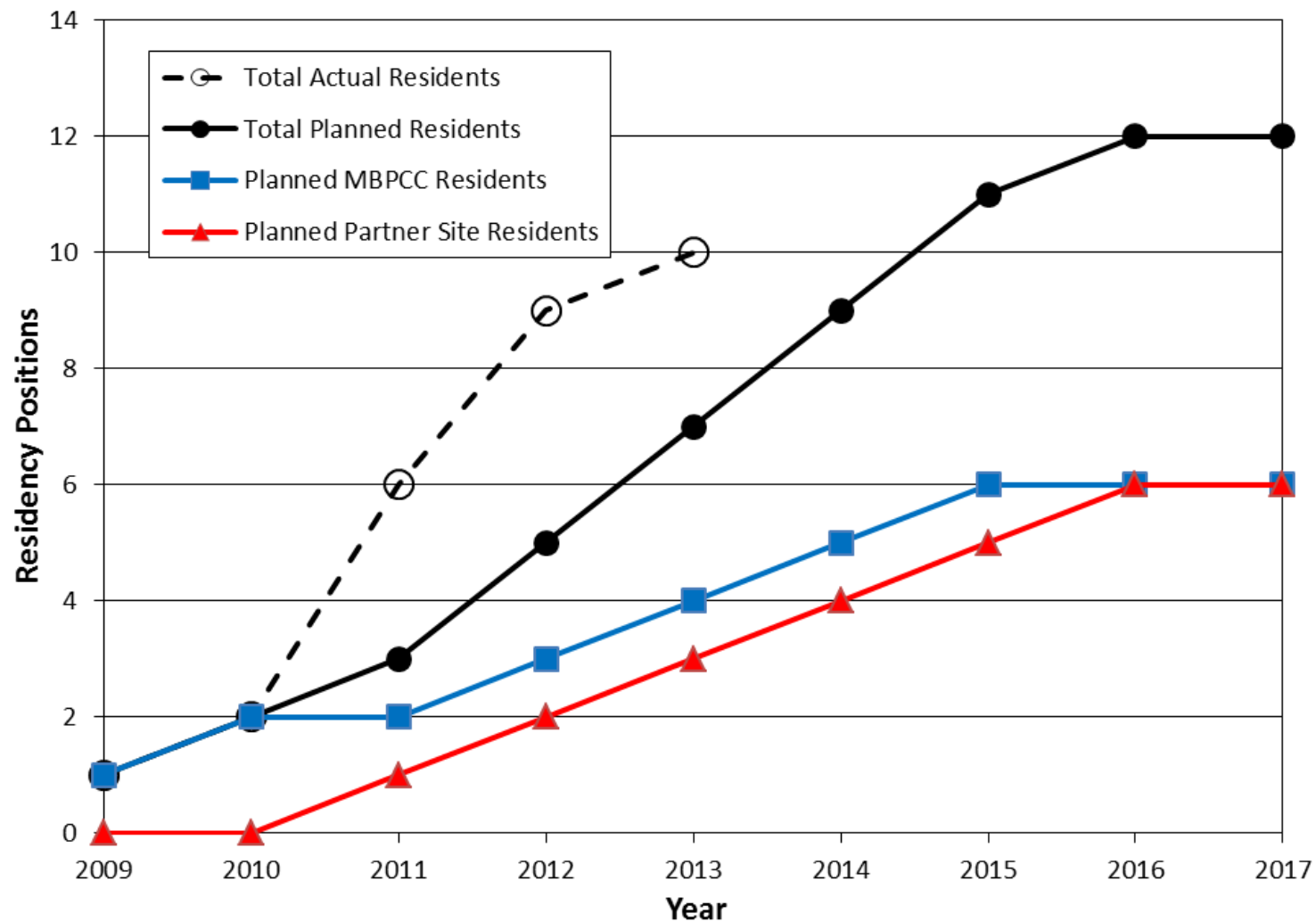
Residency Program Description

Affiliate Agreements

- Affiliate Commitments:
 - Accept one new resident per year. Affiliate sites are responsible for residents' salary (at appropriate PGY levels), benefits, and professional development funds.
 - Appoint affiliate program director responsible for implementation of program
 - Provide appropriate resources to support the residency program (e.g., space, administrative, equipment)

Residency Program Description

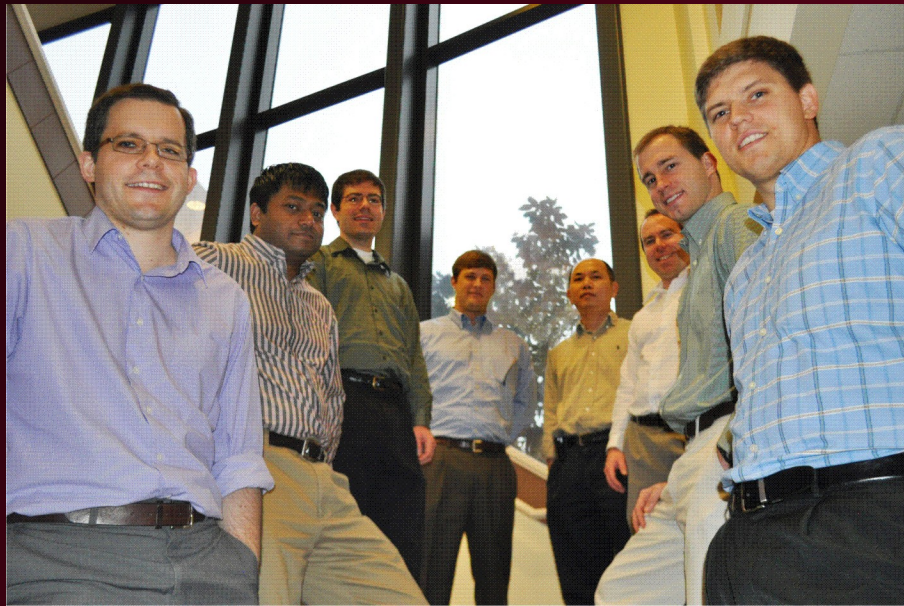
Strategic Plan for Resident Enrollment



Residency Program Description

Program Status

- Two MBPCC residents completed program. Ten residents currently in program (4 at MBPCC, 6 at affiliate sites)



Program Governance

Residency Program Committee

- Program Committee oversees program policies and resident progress
- Committee meetings:
 - Frequency: ~ monthly (minimum quarterly)
 - Affiliate PD's participate via Skype
 - Agenda
 - Recruitment, Curriculum, Resident Progress, Accreditation, etc.
 - Resident issues (Senior resident)

Program Governance

Residency Program Committee

Residency Program Committee:

- John Gibbons, Program Director
- Joseph Dugas, Deputy Program Director
- Wayne Newhauser, Chief of Physics
- Mary Ella Sanders, MBPCC Physician
- Frank Apollo, MBPCC Dosimetrist
- Yolanda Augustus, MBPCC Therapist

- Terry Wu, Program Director, Willis-Knighton
- John Duhon, Program Director, Oncologics
- Claus Yang, Program Director, U. of Miss Med Center

- Ken Hogstrom, Past-Chief of Physics (*consultant*)

- Gordon Mancuso, Senior Resident

Resident Recruitment

Residency Placement

- LSU M.S. students receive first priority
 - Unfilled positions after match opened to outside applicants
- Student assigned to training site based on internal match system using National Resident Matching Program (NRMP) algorithm
 - Fair to all sites → no biased selections
- Residency position not guaranteed, only the opportunity
 - Must be ranked as “acceptable” by Consortium



Resident Recruitment Internal Applicant Timeline

- December 15: Internal Application Deadline. Applicants indicate which Consortium programs they want to apply for
- January 1-15: Internal Applicant Interviews.
- January 15 - : Internal Applicant Match. Successful applicants have 48 hours to make a decision to either (1) accept (2) decline or (3) defer the decision until the national offer date. (e.g., March 4, 2013)

Resident Recruitment

Internal Applicant Placement

- If necessary, second and additional rounds of offers are made to internal applicants who have not received offers.
- If all candidates have received at least one offer, then all unmatched Internal applicants will be considered for remaining slots.
- Internal applicants who defer will be considered without priority along with outside applicants for vacant slots

Resident Recruitment Outside Applicant Timeline

January 15: Application Deadline for outside applicants through AAPM CAP system. Listing includes

- estimated number anticipated openings
- no specification of site

For Consortium sites with vacancies:

Late January: Selection of outside applicants for interview

February: Interviews with outside applicants

March 4: Initial offer(s) made, following WGMPRT Gentleman's Agreement

Resident Training

MBPCC Training & Responsibilities

- At MBPCC, residents credentialed after 1st year
 - Must demonstrate competency in areas of credentialing
 - Credentialed for duties of non-ABR physicist
- Two purposes:
 - More cost effective as resident is assigned ½ clinical rotation FTE
 - Resident becomes comfortable with independent work

Resident Training

Individual Resident Rotation/Project Schedule

Thomas Brown, Ph.D.
Clinical Rotation and Project Schedule: July 2012 – June 2014

YEAR	MONTH	CLINICAL ROTATION	PROJECT	PROJECT MENTOR
2012	July	Orientation (CT & Accelerators)	Orientation	Gibbons
	August	Dosimetry	IGRT commissioning	Fontenot
	September	BR Clinic, IMRT	CT / PET acceptance and commissioning	Dugas
	October	BR Initial Checks	MU Check commissioning	Moldovan
	November	Tomotherapy, BR LDR	Dosimetric Systems	Dugas
	December	BR HDR Planning	Gantry-Static IMRT: Commissioning & QA	Gibbons
2013	January	SRS = Novalis + BR Initials	Daily / IMRT QA Device Commissioning	Perrin
	February	LDR = Seed implants + Tomo + BR Closeouts	LDR Program & TPS Commissioning	Chu
	March	HDR = HDR + BR Clinic + BR IMRT	HDR Program & TPS Commissioning	Guidry

Resident Training

MBPCC Resident Projects

#	Project
1	Orientation
2	CT/PET-Simulators: Acceptance and Commissioning
3	IGRT: Acceptance and Commissioning
4	Dosimetric Systems: Acceptance, Commissioning and QA
5	HDR program and TPS commissioning
6	LDR program and TPS commissioning
7	SRS program and TPS commissioning
8	Daily QA / IMRT QA: Acceptance, Commissioning of Daily QA and IMRT QA
9	4DCT and gating: Acceptance, Commissioning and QA
10	Total Skin Electron commissioning
11	LINAC: Acceptance and Commissioning Gantry Dynamic IMRT: Acceptance and Commissioning for VMAT

#	Project
13	Gantry Static-IMRT: Acceptance, Commissioning and QA
14	Intraoperative Therapy commissioning
15	TPS: Commissioning of photons and electrons in Pinnacle
16	MU Check: Commissioning of MU Check for photons and electrons
17	Linac room design and shielding / Radiation area survey
18	Survey meters
19	HDR, CT & PET shielding and surveys
20	TomoTherapy Commissioning
21	Total Body Irradiation Commissioning
22	Radiopharmaceuticals
23	Personnel monitoring program / Sealed Source leak testing and inventory
24	State and federal radiation safety regulations

Done at Partner site

Resident Training

MBPCC Resident Project Schedule

Resident #1		Resident #2		Resident #3		Resident #4		Resident #5		Resident #6	
Year 1	July	Year 1	July	Year 2	Jan	Year 2	July	Year 2	July	Year 3	Jan
Project	Faculty	Project	Faculty	Project	Faculty	Project	Faculty	Project	Faculty	Project	Faculty
1	Gibbons	1	Gibbons	9	Chu	23	Stam	11	Perrin	13	Gibbons
2	Dugas	3	Fontenot	17	Vasiliev	11	Perrin	23	Stam	5	Guidry
3	Fontenot	2	Dugas	19	Vasiliev	20	Gibbons	7	Neck	10	Moldovan
4	Dugas	16	Moldovan	18	Guidry	7	Neck	20	Gibbons	6	Chu
16	Moldovan	4	Dugas	11	Perrin	14	Partner site	14	Partner site	14	Partner site
8	Perrin	13	Gibbons	24	Stam	21	Partner Site / Gibbons	21	Partner Site / Gibbons	21	Partner Site / Gibbons
13	Gibbons	8	Perrin	1	Gibbons	12	Fontenot	19	Vasiliev	23	Stam
5	Guidry	6	Chu	2	Dugas	17	Vasiliev	12	Fontenot	15	Zhang
6	Chu	5	Guidry	3	Fontenot	24	Stam	17	Vasiliev	20	Gibbons
10	Moldovan	9	Chu	4	Dugas	18	Guidry	24	Stam	7	Neck
9	Chu	15	Zhang	16	Moldovan	19	Vasiliev	18	Guidry	12	Fontenot
15	Zhang	10	Moldovan	8	Perrin	22	Partner Site	22	Partner Site	22	Partner Site

Resident Evaluation

Individual Resident Oral Exams

- Residents given oral exams every four months
- Minimum of four faculty administer:
 - Two from Resident's home site
 - Two from another Consortium site
- Exams cover clinical rotations, and all projects

Thursday, November 29

Time: 10:00 – 12:00 am

Resident: **Jeffrey Kemp (MBPCC)**

Topics: Dosimetry (Apollo)
IMRT QA/TLDs (Dugas)
CT/PET-Simulator Commissioning (Dugas)
IGRT Commissioning (Fontenot)

Faculty: MBPCC:
John Gibbons
Joe Dugas

UMMC:
Claus Yang

Willis-Knighton:
Terry Wu

Resident Evaluation Oral Exam Evaluation Form

Assessment Scale

- 5 – Excellent:** Knowledge of examination material is exceptional in all areas on a consistent basis; examination performance is considered superior.
- 4 – Above Expectations:** Examination results exceed expectations; performance is of consistent high quality.
- 3 – Meets Expectations:** Competent level of performance that consistently meets high standards.
- 2 – Needs Improvement:** Performance, results, and/or consistency is below standards in certain areas. Improvement is needed.
- 1 – Unsatisfactory:** Performance, results, and/or consistency is below standard in most/all areas. Immediate improvement is required that results in “Meets Expectation” rating within 60 days.

Topic:

IMBT QA/TUDS

Mentor:

Dvgs

Score:

5

Comments:

in-vivo. Should know blow curve \bar{p} fading. Should know γ exponent & paper by Dan Low. Should know EDH preferred for IMBT QA. Should know relative speeds of Th, XV, EDQZ & typical doses to get $D=1$.

Resident Evaluation

Oral Exams – Summary Report

RESIDENCY ORAL EXAM EVALUATION NOVEMBER 28, 2012

IMRT QA/TLDs (Score*: 4.6):

1. Should know the shape of the glow curve before fading.
2. Should know the Gamma equation and paper by Dan Low (Med. Phys. 25(5), 656-661 (1998)).
3. Review dose difference and DTA concepts
4. Should know that EDR is preferred over XV for IMRT QA.
5. Should know relative speeds of TL, XV and EDR2 film, along with approximate doses necessary to get OD=1 and where films saturate.
6. Very good knowledge of TLD theory and use demonstrated.
7. Understood very well IMRT QA – Calibration check and Setup check.
8. Good answer for clinical judgment if you have trouble with IMRT QA comparisons.

CT/PET Simulator Commissioning (Score: 4.4):

1. Should know typical doses from CT.
2. Should know why ρ is used for density conversion over ρ_e , and why.
3. Should be familiar with TG111 protocol (non-CTDI formalism for CT dose measurement)
4. Review CT # to density graph.
5. Seemed to understand well the tests for acceptance.
6. Great job explaining CTDI measurements.

Resident Evaluation

Individual Resident Evaluation Record

	Resident:	Ito, Shima			Adhikary, Bijoy		
	Start Date:	7/1/2010			10/1/2011		
	Resident slot:	N/A			Resident #6		
Project	Current Faculty	Rotation	Report	Oral Exam	Rotation	Report	Oral Exam
Orientation	Gibbons	July-10	N/A	10/27/2010	October-11	N/A	
CT/PET-Simulators: Acceptance and Commissioning	Dugas	August-10	✓	10/27/2010	November-11	✓	3/26/2012
IGRT: Acceptance and Commissioning	Fontenot	September-10	✓	10/27/2010	December-11	✓	3/26/2012
Dosimetric Systems: Acceptance, Commissioning and QA	Dugas	October-10	✓	12/16/2010	January-12	✓	3/26/2012
HDR program and TPS commissioning	Guidry	November-10	✓	4/28/2011	February-12	✓	11/27/2012
LDR program and TPS commissioning	Chu	December-10	✓	2/22/2011	March-12	✓	8/6/2012

Resident Evaluation Typhon Software

- Web-based Student Tracking Software
- EASI: Evaluation and Survey Instrument:
 - Used to create surveys for resident/faculty evaluations
- AHST: Allied Health Student Tracking:
 - Used to track resident progress through competencies, project reports, etc.

Resident Evaluation Typhon Software Reports

Typhon Group: AHST Student Tracking System Administration - Windows Internet Explorer

https://www.typhongroup.net/ahst/admin/report-admincareplans.asp?sort=&archive= Typhon Group LLC [US] Google

File Edit View Favorites Tools Help

Typhon Group: AHST Student Tracking System A...

TyphonGroup Healthcare Solutions

AHST Student Tracking System - Administration Section
EXTERNAL DOCUMENTS
BY STUDENT

Mary Bird Perkins Cancer Center - Medical Physics (Acct #9049) John Gibbons, Ph.D. is logged in. [Log Out](#)

Home Setup Manage Reports Help

EXTERNAL DOCUMENTS
This report shows the external documents a particular student has uploaded to the system. Click on a column heading to sort by that column ascending, again for descending.

FILTERS
 Student: Adhikary, Bijoyananda
 Category: --All--
[Generate Report](#)

EXTERNAL DOCUMENTS FOR: Adhikary, Bijoyananda [View/Export Results to Excel](#)

Date	Category/Description	Score	Clinical Site	View	Lock/Edit Comments/Score
12/9/2011	Project Reports [PET/CT acceptance and commissioning] Document Uploaded: 3/12/2012 9:31:07 AM CT		Mary Bird Perkins Cancer Center		
1/10/2012	Project Reports [IGRT Commissioning] Document Uploaded: 6/15/2012 12:15:53 PM CT		Mary Bird Perkins Cancer Center		
2/8/2012	Project Reports [Dosimetric Systems] Document Uploaded: 6/15/2012 12:17:00 PM CT		Mary Bird Perkins Cancer Center		
3/23/2012	Project Reports [HDR Program and TPS Commissioning] Document Uploaded: 4/16/2012 2:47:24 PM CT		Mary Bird Perkins Cancer Center		
5/2/2012	Project Reports [Appendix A of LDR program and TPS commissioning Project Report] Document Uploaded: 6/16/2012 6:33:12 PM CT		Mary Bird Perkins Cancer Center		
5/2/2012	Project Reports [Appendix B of LDR program and TPS commissioning Project Report] Document Uploaded: 6/16/2012 6:34:18 PM CT		Mary Bird Perkins Cancer Center		
5/2/2012	Project Reports [LDR program and TPS commissioning] Document Uploaded: 6/16/2012 6:31:17 PM CT		Mary Bird Perkins Cancer Center		
6/16/2012	Project Reports [Appendix A of SRS Program Commissioning Project Report]		Mary Bird Perkins		

Resident Evaluation

Typhon Software Evaluations

Clinical instructor eval. of resident

Completed by the **Clinical Instructors**, regarding the **Students (ALL)**, answered on a **As needed** basis.
Before beginning an evaluation, the clinical instructors will be asked to select which student they are evaluating.

1 Month of clinical rotation

--SELECT ONE--

(ANSWER REQUIRED)

2 Year

--SELECT ONE--

(ANSWER REQUIRED)

3 Please select the clinical rotation for which you are evaluating the resident's performance

--SELECT ONE--

(ANSWER REQUIRED)

4 Resident's understanding of the covered materials and topics

Poor Fair Good Excellent Superior

Please add additional comments if desired:

(ANSWER REQUIRED)

5 Resident's performance in completing the assignments in the rotation

Poor Fair Good Excellent Superior

Please add additional comments if desired:

(ANSWER REQUIRED)

6 Please rate the resident's initiative in ensuring that all rotation objectives were met

Poor Fair Good Excellent Superior

Please add additional comments if desired:

Resident Evaluation Typhon Software Case Logs



OPTIONAL FILTERS

Student: Ito, Shima Grad. Class: --All-- Group: --All--

Date Range: From To

Semester: --All--

Course: --All--

Clinical Site: --All-- [MORE](#)

Clinical Instructor: --All-- [MORE](#)

[Clear Filters](#)

Sort by: Item Category Display [CATEGORY] before Item

Show only **critical** procedures/skills

Show only procedures/skills with minimum requirements

[Apply Filters](#) [Export to PDF](#)

CASE LOG TOTALS - PROCEDURES/SKILLS LIST

[View/Export Results to Excel](#)

The minimum requirements are optionally entered by the administrator. Items with minimums will appear in red if the minimum has not been met, and will turn to blue once the minimum has been met. Minimum requirements are only valid if you have filtered for a particular student.

OBSERVED	ASSISTED	PERFORMED	MINIMUM REQUIRED	ITEM [CATEGORY]
0	0	1	(1) Asst or Perf	AAPM/RSNA CT imaging online module [IMAGING]
0	0	1	(1) Asst or Perf	AAPM/RSNA MRI imaging online module [IMAGING]
0	0	0	(1) Asst or Perf	AAPM/RSNA radiation biology online module [RADIATION SAFETY AND SHIELDING DESIGN]
0	0	0	(1) Asst or Perf	AAPM/RSNA radiation protection online module [RADIATION SAFETY AND SHIELDING DESIGN]
0	0	1	(1) Asst or Perf	AAPM/RSNA US imaging online module [IMAGING]
1	0	1	(1) Asst or Perf	Delivery techniques - TomoTherapy, SMLC, DMLC, IMA [IMRT, IGRT, 4DCT, & RESPIRATORY GATING]
0	0	1	(1) Asst or Perf	Fabricate custom electron cerrobend block / device [EXT. BEAM PLANNING/VERIFICATION/DELIVERY]
0	0	1	(1) Asst or Perf	Fabricate custom photon cerrobend block / device [EXT. BEAM PLANNING/VERIFICATION/DELIVERY]
1	1	0	(1) Asst or Perf	Fabricate patient cast and/or mold [EXT. BEAM PLANNING/VERIFICATION/DELIVERY]
0	0	1	(1) Asst or Perf	Measure small-field beam data - PDD, OF, profiles [SPEC. PROC. (SRS, SRT, TBI, TSET, IORT)]
1	0	0	(1) Asst or Perf	Observe cylinder applicator insertion [BRACHY PLANNING/VERIFICATION/DELIVERY]
0	0	0	(1) Asst or Perf	Observe tandem and cylinder applicator insertion [BRACHY PLANNING/VERIFICATION/DELIVERY]
1	0	0	(1) Asst or Perf	Observe tandem and ovoids applicator insertion [BRACHY PLANNING/VERIFICATION/DELIVERY]
0	0	2	(1) Asst or Perf	Participate in 4DCT acquisition and data processin [IMRT, IGRT, 4DCT, & RESPIRATORY GATING]

Program Accreditation

CAMPEP Accreditation Timeline

- July 2011: Application submitted to CAMPEP.
- Initial self-study written for MBPCC accreditation only.
 - Subsequent discussions with CAMPEP encourage including all affiliate sites
- October 2011: CAMPEP request for resubmission under new program director.
- November 2011: Initial CAMPEP review received. Request additional materials from affiliate sites

Program Accreditation

CAMPEP Accreditation Timeline

February 2012: Response submitted to CAMPEP review

June 2012: CAMPEP site visit.

August 2012: Full accreditation (5-year) granted

Program Accreditation

CAMPEP Site Visit

- Site Visit Team: 2 Physicists (Peter Dunscombe (chair), John Antolak), 1 Physician (Harold Lau)
- Site Visit Duration 2 ½ Days:
 - Day 1: All site visitors at MBPCC.
 - Meet with all faculty, physicians, administration, etc.
 - Skype conference with affiliate program directors
 - Face to face meeting with all six residents
 - Day 2: SV team splits up and visits 3 affiliate sites
 - Morning: Travel and ~3 hour visit at each site
 - Afternoon: SV team returns and writes draft report
 - Day 3: SV team reviews report with PD

Program Accreditation

CAMPEP Recommendations

- Resident Projects should be cohesive among the sites:
 - Project descriptions should be compared to ensure consistency across the Consortium.
 - Consideration should be given to developing a standard format for project reports.
 - Evaluation of written project reports should include an assessment by a Consortium staff member at a site other than that of the submitting resident.

Program Accreditation

CAMPEP Recommendations

- On-going efforts will be required to enhance and maintain the cohesion of the program:
 - A senior resident should be appointed to the Program Committee to provide input on resident issues.
 - Face to face resident meetings should be facilitated and supported ideally at a frequency of 2 per year.
 - Support for professional development of residents should be harmonized as much as possible.

Conclusions

- A hub-and-spoke model residency program has been successfully established with MBPCC and three affiliate sites in Louisiana and Mississippi.
- The hub and spoke model offers more opportunities for resident training, with more residents, faculty and procedures than available at a single site.
- The hub-and-spoke model presents some challenges to ensure program consistency and uniformity of resident training.